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SECRETS

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April
2013

AUSTRALIAN

PERSONAL COMPUTER

NEW LIFE FOR OLD TECH

HOW TO PUT YOUR RETIRED
HARDWARE BACK TO WORK
BUILD A MEDIA STREAMER
NETWORK STORAGE BOX
BITTORRENT DOWNLOADER
OR A GAMES SERVER

DON'T
WASTE
YOUR OLD PC,
LAPTOP,
TABLET OR
PHONE!



FIRST TEST

WINDOWS 8 PRO TABLET DELIVERS

The ASUS VivoTab Smart crams Win 8 into a thin and affordable tablet

COMPARISON

DREAM SCREENS

Seriously large, high-res PC displays come down in price

TUTORIALS

HOW TO RUN IN YOUR NEW PC

+ Upgrade a PC for video editing
+ Easily migrate a boot drive



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VG SERIES MONITORS



VG278HE

"Despite it's flaws, this is definitely one of the better 3D displays on the market"

- Awarded to VG278H by APC, April 2012.



VG278H

VG248QE

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- PANEL WARRANTY
- PERFECT PIXEL WARRANTY

ULTRA-SMOOTH VISUAL ENJOYMENT

ASUS VG Series fast gaming monitors shortens the time it takes for rendered frames to display on the screen. Lower monitor latency gives a user the opportunity to improve their in-game response time. The 144Hz rapid refresh rate (VG278HE & VG248QE models) speeds up the frames per second to deliver ultra-smooth motion scenes in 2D intense actions. The response time is also reduced on all models to eliminate tracers by controlling voltage levels when driving liquid crystals thus ensuring fluid and clear video playback.

Conventional 60Hz LCDs show extensive motion blur, and can be distracting when playing games or movies with fast movement. The ASUS VG Series monitors half the effects of motion blur to deliver a perceivable difference for natural movement and crisp edges on fast paced environments.

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The VG Series is compatible with the NVIDIA 3D Vision™ 2 kit. Through NVIDIA® 3D Vision™ 2 glasses technology, it instantly takes you into another dimension - transforming all your gaming experiences and movies to 3D. Also with the latest NVIDIA® 3D LightBoost™ Technology, user can enjoy twice the brightness of conventional 3D technology in 3D mode with zero increase in total energy consumption.



	SIZE	RESOLUTION	RESPONSE TIME	REFRESH RATE	DISPLAY COLORS	BRIGHTNESS	VIEWING ANGLE	3D TECHNOLOGY	SPEAKERS	INPUT/ OUTPUT	TILT/SWIVEL	NVIDIA 3D KIT
VG278HE	27" Wide Screen, WLED (16:9)	1920 x 1080 (Full HD)	2ms (Gray to Gray)	144Hz	16.7M	300cd/m ²	170° (H) / 160° (V)	NVIDIA 3D Vision™ 2 Ready NVIDIA 3D LightBoost™	3W x 2 stereos, RMS	HDMI , D-Sub, Dual-link DVI-D (support NVIDIA® 3D Vision)	Tilt, Swivel, Height Adjustment	Compatible
VG278H				120Hz								Included
VG248QE	24" Wide Screen, WLED (16:9)		1ms (Gray to Gray)	144Hz		350cd/m ²			3W x 2 stereos, RMS	HDMI, DisplayPort, Dual-link DVI-D (support NVIDIA® 3D Vision)	Tilt, Swivel, Height Adjustment, Pivot	Compatible

03

editorial

TONY SARNO

You can see all the pieces
finally coming together



Sorry Microsoft. We judged you too harshly. When Windows 8 and its Modern UI first appeared, we were astonished at the insanity of sticking a tablet interface onto a new OS. We said so and called you many things, and questioned whether Redmond had anybody with product vision who understood anything about user interfaces. And when we saw users trying to figure out the difference between Windows RT and Windows 8, we asked who in their right mind would put out two versions of a new tablet OS? And when the first Windows 8 Pro tablet that arrived in our labs – the Gigabyte S1082 – looked like a throwback to Windows 7 tablets from 2010, we shook our heads and privately declared Windows 8 and everything associated with it to be a catastrophe.

But perhaps like all media, we rushed in and judged without seeing the bigger picture. When Dan Gardiner walked into my office last week and showed me the ASUS VivoTab Smart, I was dumbfounded. Unlike the Gigabyte tablet we'd poked fun at, the VivoTab – with an Atom chip inside and Windows 8 Pro – was lighter and thinner than most standard late-model Android tablets. In addition it came with a smashing 7 hours plus of battery life and it cost just \$599. We're not talking about a tablet with an ARM chip, but one with a full x86 Intel processor able to run any of your desktop Windows applications.

Suddenly with the VivoTab Smart in our hands, Windows 8 made more sense. Switch to the Modern UI and you could use the VivoTab Smart as a tablet, with probably the most advanced gesture-based tablet UI in the market. Go back the desktop UI, add a wireless keyboard and plug in a mouse, and you had a real Windows laptop on which you could fire up any of the Windows apps on your PC.

That was the point at which Microsoft's vision for Win 8 started to make more sense. Then, we got to try Office 365 Premium, the term used for the subscription version of the new Office 2013 suite. Not only are the newest versions of Word, Excel and PowerPoint a pleasure to use with a cleaner, refined interface and gorgeous transitions, but as part of Office 365 Premium, you get something called Office on Demand. As we say in our story on page 6, Office on Demand is worth the price of your Office 365 Premium subscription alone. It's a virtualised version of the Office desktop app that you can stream via the internet to any PC and use as if it were the real thing. So no more having to use browser-based Office apps. Office on Demand shows Microsoft can actually build great cloud apps.

You can see all the pieces finally coming together: Windows 8, touchscreen devices and tablets that make the new OS finally make sense, along with a cloud strategy that's just delivered some of the most spectacular cloud-based software we've yet seen. Microsoft, we judged you too harshly.

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apc

EDITORIAL

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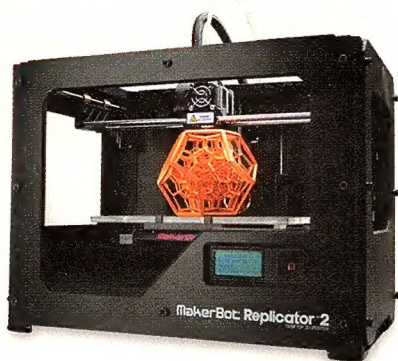
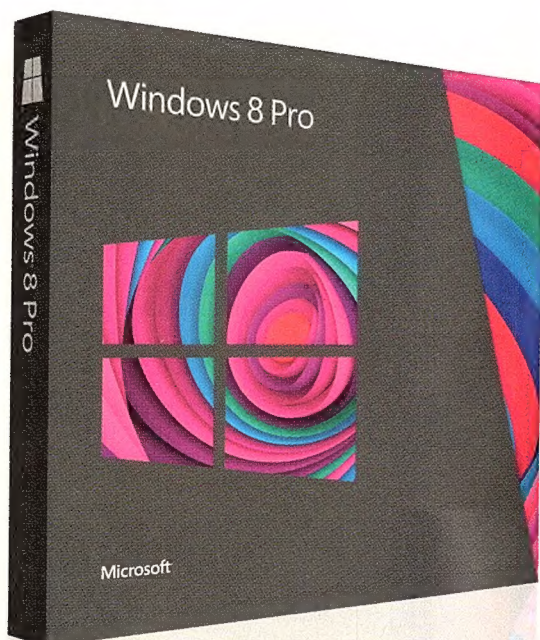


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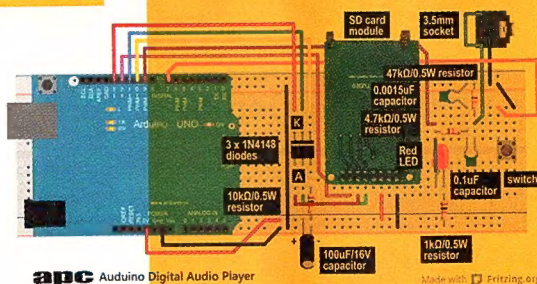
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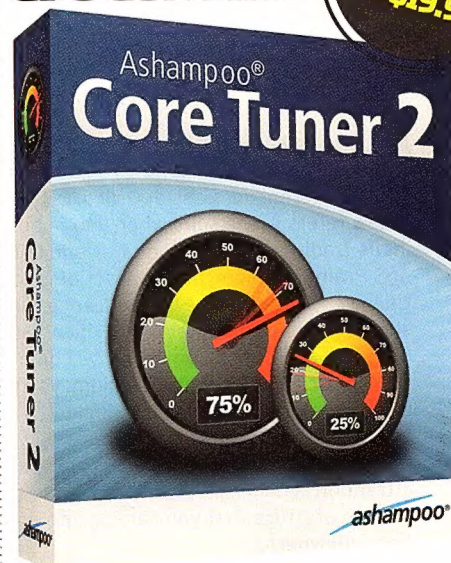
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The world's most technically advanced Linux, Fedora 18 'Spherical Cow' now comes with the MATE classic desktop and is the first Linux to support Secure Boot used in the latest Windows 8 systems.



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Voice dictation could be the way of the future for productivity, with the ability to make you work faster and more accurately.



DICTATION

Top **10** reasons to dump your keyboard

Dragon NaturallySpeaking 12 is more accurate than a typist while voice recognition in mobile devices continues to improve. **David Hague** shows the reasons why it's time to dump the keyboard.

1 SPEED

We can speak faster than we can type, and once the basics are understood by Dragon 12, documents can be produced much faster by voice. Switching from typing text in a word processor to performing commands is also quicker than using shortcut keys or clicking a mouse.

2 ACCURACY (1)

Dragon 'translates' based on context and not individual words. So the chances of getting words and phrases such as 'their' and 'they're' mixed up or misused is minimised, as is the misuse of the dreaded apostrophe.

3 FLEXIBILITY

There's no need to physically switch between applications using the keyboard or mouse. Using your voice, a single command lets you flick between apps or windows to perform a different function. For example, switch to a browser window to select a web site URL and then copy and paste it into a document. This is so much faster than the manual way.

4 CONCENTRATION

If you're writing a manuscript, story or novel, you can concentrate on the subject, plot or concept rather than on the keyboard. The mind can then ramble, create dot points or outlines for later editing, instead of having to multitask between the story and the typing, which is good for non-typists!

5 CONVENIENCE (1)

You're not bound to the keyboard or a specific location of a computer. Many smartphones and dictation machines can have their content 'read' by Dragon 12 letting you transcribe from voice recorder modules. This means interviews or recordings in the field can then be accurately fed into a word processing application for correction and editing.

6 ASSISTANCE

According to StepAhead Australia, spinal cord injuries affect around

20,000 Australians, with around 300 new cases each year (2008: 137 paraplegic and 136 quadriplegic patients). Voice technology allows these folk to be creative via the written word other than by using transcription services. It also keeps privacy issues intact.

7 COST

Using the smartphone voice recorder to do stocktakes, for example, is made cheaper without the need for expensive mobile technology recording systems. Simply quote the part number and quantity, and this information can later be transcribed into a program such as Excel for analysis, costing or other data manipulation.

8 CONVENIENCE (2)

Using a headset and a netbook or laptop, notes, documents, thoughts and ideas can be collected in places and at times otherwise impossible (such as driving a car on a long trip). Especially of benefit in this area are the outlining capabilities of Microsoft Word, which can be switched on to become full-on documents, complete with indexes, footnotes, tables of content and more, all from the dictated outline.

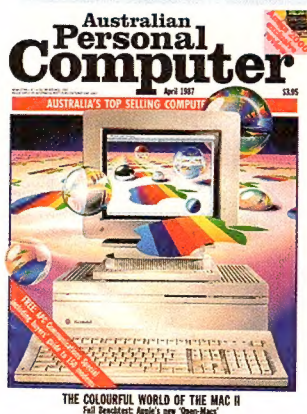
9 ACCURACY (2)

Having voice-dictated text played back to you via voice synthesis lets you get a better feel for how a document flows than simply reading it. You can also pick up errors more easily; it's a well-accepted fact that doing your own proofreading by eye is not 100% effective, even for experienced journalists and writers.

10 FUN

There's a simple joy in playing Captain Jean-Luc Picard on *Star Trek* or one of the crew of the *Discovery* in *2001: A Space Odyssey*. Giving voice commands to 'Computer' or 'HAL' is especially fun if you're a sci-fi fan. Of course, onlookers might think you're barking mad, but that's all part of the experience. **ATC**

THE (A)PC REVOLUTION APRIL, 1987



APPLE LAUNCHES MAC II

Apple's Macintosh has been dismissed by serious programmers as no more than an executive toy, but the introduction of the Mac II and MAC SE to the family should dispel such criticism. The excitement surrounding it comes from the use of a powerful 68020 chip and its 68881 co-processor to place it firmly in the 'advanced machine' league. The colour capabilities are excellent and it's nice to have six expansion slots. But the really important thing about the Mac II is that it marks Apple's entry into the realm of serious computing. Sans monitor and hard disk, it costs \$7,693. With a 20MB hard disk it's \$10,980. You can add an RGB monitor for \$1,911 and video card for \$972. The keyboard costs \$240 or \$440 for the enhanced model.

SARDINE FOR YOUR PC

Sardine, just released by Traveling Software in the States, is a chip which plugs into lapheld machines, such as the Tandy 102, NEC and Olivetti M10. It crams in a spelling checker, a word processor and (if you have a diskette drive) a 33,000-word dictionary. The cost is a pitifully low US\$170. You need Traveling Software's Ultimate ROM II to make full use of it, but it will function with other word processors.



SSDs

USB KEY MAKER RELEASES SSD

SanDisk makes USB keys, flash drives and SD cards. Now it makes SSDs — a sign that prices may start to come down, says **Dave James**.

The SSD market is one of the most vibrant sectors of the PC components arena for the simple reason that it's still young and hasn't yet divided into a few key players. There are so many manufacturers offering so many drives that the choice is simply vast and a little overwhelming.

It also means you get left-field drives coming in that turn out to be rather special. The SanDisk Ultra Plus is such a solid-state drive (SSD). SanDisk is a big name in general storage, but it's not known for its SSDs. It has had a range before — the well-received Extreme SSD series — although this Ultra Plus drive eschews the aging SandForce controller of the previous drives for the more recent Marvell 88SS9175 and also pairs it with SanDisk's own 19nm NAND flash chips.

Being able to use its own memory chips means that SanDisk can price its new drives aggressively (they're expected to cost less than \$300 when announced locally). The Ultra Plus also uses the less feature-packed of Marvell's controllers, with only four NAND channels as opposed to the traditional eight. That's not an issue here as there are only four 64GB chips on the tiny PCB inside that package. This all keeps cost and power draw down, and there are rumours you'll find these diminutive SSDs jammed

into a few good ultrabooks very soon as well.

In terms of performance, the headline sequential read/write figures aren't that stellar, but have still improved over the weak incompressible performance of the SandForce controller. The read speed is decent, clocking in at around 450MB/s, but the write speed is languishing down to around 386MB/s. That's slow in comparison with some of the OCZ and Corsair drives we've seen recently, but quicker than the non-Pro version of Samsung's 840-series drive.

The Ultra Plus, however, impresses in the 4K random read/write results, posting the fastest read speeds we've seen and is pushing on for 60MB/s on the writes. SanDisk has made random read/write performance a real focus, going back a good few years now, with its nCache software. This configures some of the flash memory into a hybrid SLC mode, sending small files to that higher-performance area. Then, when the drive is idle, the garbage collection routines fire those files into the slower MLC portion of the drive. It's also got a 128MB dedicated cache chip, which should help performance. While pricing is yet to be announced in Australia, chances are that if you can't afford to push the boat out for either the OCZ Vertex 4 or Vector drives, then the SanDisk Ultra Plus won't disappoint. **ATC**

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¹ Based on IBM testing and documented in IBM System x® Virtualisation Server Consolidation sizing methodology. IBM Flex System x240 supports 2.7X more Peak Utilisation Virtual Machines (VMs) than previous generation BladeCenter® HS22V.

² Based on IDC white paper "The Economics of Virtualisation: Moving Toward an Application-Based Cost Model," Michelle Bailey, November 2009, <http://www.vmware.com/files/pdf/Virtualization-application-based-cost-model-WP-EN.pdf>

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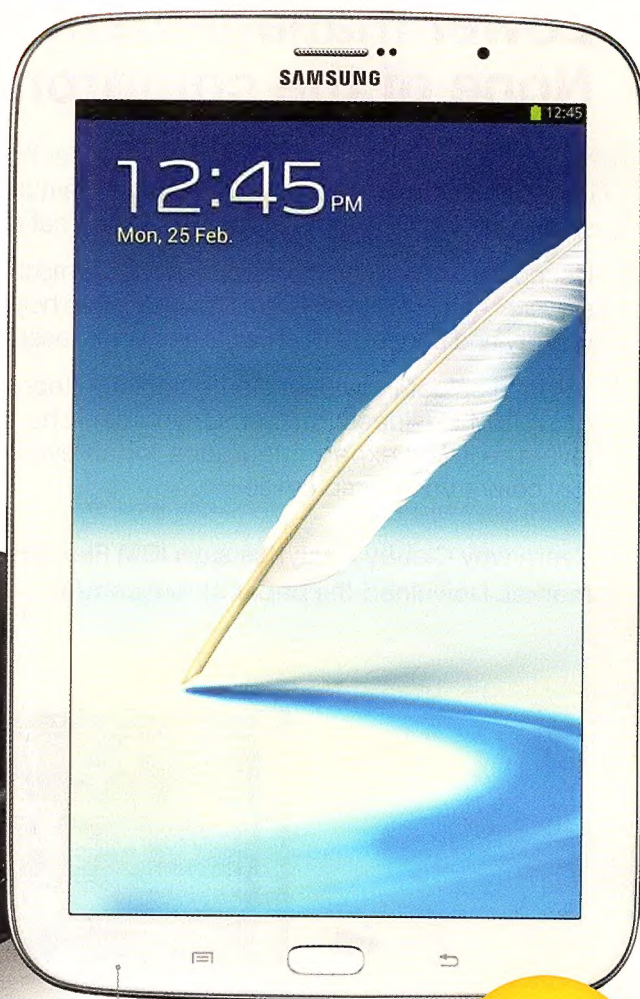
Samsung HomeSync

The robot lovers at Samsung have gone a little Android crazy of late, with the HomeSync being the latest device that has shoehorned Google's mobile OS inside. More than a little reminiscent of the various Google TV boxes that have been released over the last couple of years, this home media hub may well be the first Android-powered PVR that doesn't, well, suck. With the latest iteration of Android (Jelly Bean) on board and design courtesy of arguably the most capable Android-wrangling vendor, we're holding out hope that this could be the media streaming/recording box that makes more of the mobile OS than a dog's breakfast.

ONLINE www.samsung.com/au



TBC



TBC

Samsung Galaxy Note 8.0

If Samsung's smaller 5.5in Galaxy Note II smartphone isn't quite big enough to accommodate your Andre the Giant-sized mitts, the Korean titan is now offering an 8in tablet that's aiming to tackle the iPad Mini, but can also still make phone calls thanks to an HSPA+ 21Mbps radio. It's otherwise pretty similar to the smaller model, with a quad-core Exynos CPU and 1,280 x 800-pixel display. We're not sure about you, but 8in seems a tad too big to us. A 7.5in model, on the other hand...

ONLINE www.samsung.com/au



\$149

Combat Creatures Attacknid

Fighting robots aren't anything particularly new, but it's hard to deny the appeal of mechanical machines duking it out, though it's usually been restricted to the realm of anime, blockbuster movie or video game. The Attacknids look to bring robot fighting to the real world, however, and while they might ostensibly be toys, that doesn't stop us from wanting a pair for afternoon office deathmatches. These little bots can fire ping pong balls and plastic discs at each other, and have detachable armour that pops off when hit. Sorry, Rock 'Em Sock 'Em Robots, looks like you're finally getting retired.

ONLINE www.combatcreatures.com



US\$79

GameStick

This gamepad and Bluetooth dongle package initially struck us as yet another cheap console knock-off, but upon further inspection, it's actually pretty compelling. The way the GameStick works is by packing a fairly generic-looking gamepad full of smartphone hardware and the Android OS. To output video, users plug a small Bluetooth dongle into their TV's HDMI port, where the familiar Android system is blown up to lounge room size. That's where things get interesting. With developers coding mobile games for increasingly high-res, powerful mobile devices, many Android games actually look damn good at TV size. And best of all, being priced for mobile consumers, most of those apps are dirt cheap by console standards.

ONLINE www.gamestick.tv

iCrib Bean Bag

There are few pieces of furniture more suited to a life of ease than bean bags. But if you're already rocking a sack full of polystyrene as lounge room furniture, there's no reason to truncate your aspirations to leisure there. Why not double down with a bean bag for your tablet, too? The iCrib is designed as an easy-to-balance hands-free stand for devices like the iPad. And it does appear to make watching movies on a tablet much less of an exercise in cramp generation. With a built-in pouch for headphones and a soft filling that affords it a second life as a pillow, it's the perfect accompaniment to a life of sedentary pleasure.

ONLINE www.lifeliveitup.com.au



\$29.95



TBC

HTC One

Proving that 2013 will undoubtedly be the year that every flagship smartphone gets supersized, HTC's just-released 4.7in model, dubbed simply as 'The One', is the first phone under 5in to use a 1080p screen, giving it a record-busting pixel per inch (ppi) count of 468. It's going up against Sony's 5in Xperia Z, which also has a 1080p display, but *only* manages 443ppi. At that kind of resolution, though, it's reportedly difficult for the human eye to distinguish the difference. An aluminium unibody design does give HTC's One a premium look and feel, plus there's an UltraPixel camera with great low-light performance, so it's not just the screen that's worth bragging about.

ONLINE www.htc.com/au

WINDOWS 8: WHICH LICENCE TO CHOOSE?

There are now four versions of Windows 8 to choose from. **David Braue** helps you pick the best one for you.

The recent announcement that Microsoft had sold 60 million licences for Windows 8, its much-hyped revamp of its hugely successful Windows 7 operating system, hammered home one strong point: if you haven't already upgraded, you probably will in the near future.

Large businesses may be last in line, however: many of those running Windows 7 have only recently completed their migrations from Windows XP, which had a much longer lifespan in the corporate world than it did on most consumers' PCs. Moving to Windows 8 – or for that matter, any brand-new operating system – is unthinkable for organisations that are more careful about costs and risk than ever.

"Typically around the time that the first service pack is released, you'll start to see some enterprises moving to that," says Neil Campbell, director of solutions with Dimension Data Australia, which is one of Microsoft's largest Windows implementation partners.

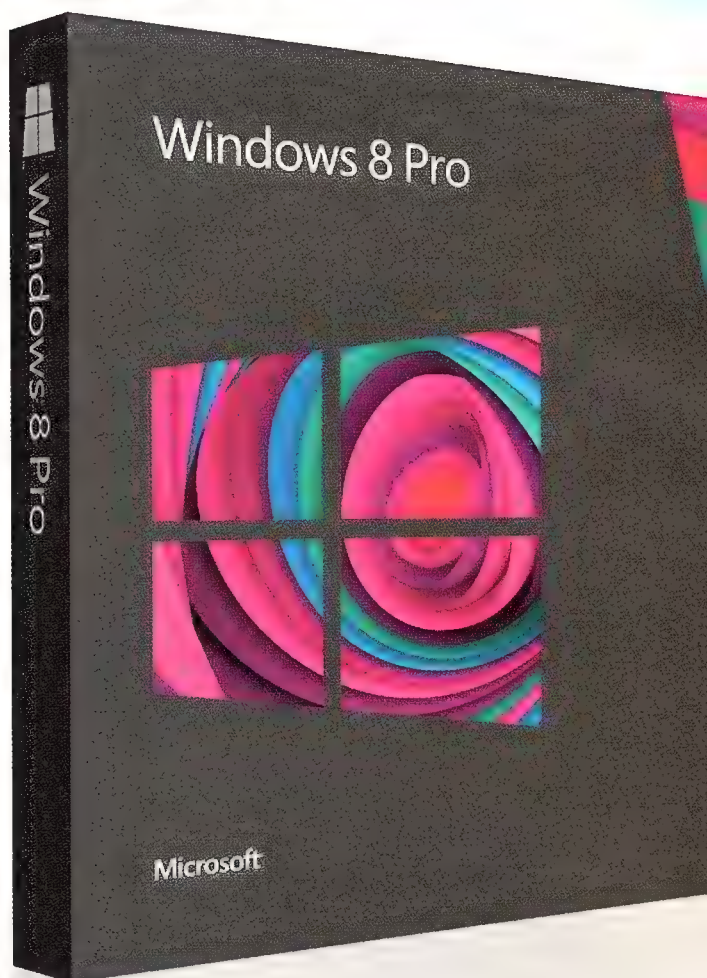
"They have to take a very risk averse view. You'll see enterprises starting to test proof of concepts but at this point you typically won't see them adopting it. However, you'll really see a push from users as they start to become comfortable with Windows 8. Home users are normally much quicker to adopt new versions."

CHOICES, CHOICES

That doesn't mean there aren't millions of smaller businesses and individual users keen to make the shift. And with the inexorable rise of Bring Your Own Device (BYOD) strategies, the eagerness of those home users for Windows 8 is going to create new pressures on the companies they work for.

The retail story around Windows 8 is relatively simple. There are fewer versions of Windows 8 to choose from – there are four – than previous versions; for example, Windows 7 came in six different flavours.

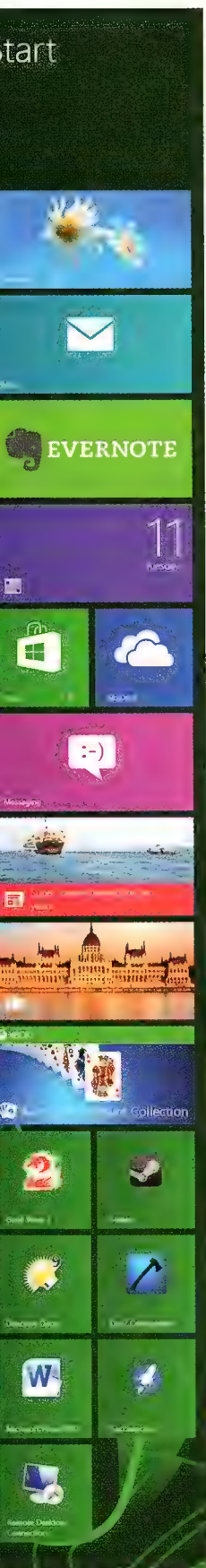
Windows RT is the name for the company's new tablet and ultrabook-focused operating system. This version, which comes preinstalled on computers rather than as an upgrade option, incorporates specialised versions of applications like Office Home & Student 2013 RT, but won't run conventional Windows



applications and can only be expanded through Microsoft's Windows Store.

By contrast, Windows 8 offers the conventional upgrade path for existing systems as well as being bundled on new PCs. It incorporates the base operating system, with all its Modern user interface swish, as well as standbys like Internet Explorer 10, mail, calendar, messaging, photo management and built-in support for Microsoft's cloud-based SkyDrive storage service. Also included are security tools like Windows Defender and Windows Firewall.

Windows 8 Pro incorporates all of these, while adding



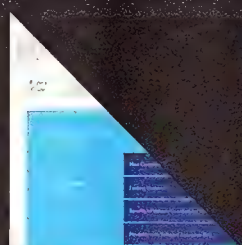


The full version of Windows 8 offers an easy upgrade path from Windows 7.

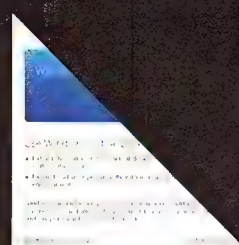
Neil Campbell, director of solutions with Dimension Data Australia.



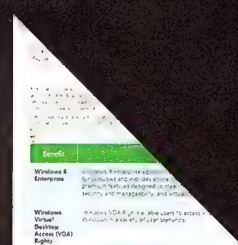
USEFUL LINKS



ABOUT WINDOWS 8 LICENSING
tinyurl.com/cczb63v



WINDOWS VIRTUAL DESKTOP ACCESS
tinyurl.com/cvja9o7



SOFTWARE ASSURANCE BENEFITS
tinyurl.com/aa37ltb

business-related features such as BitLocker encryption, Remote Desktop Connection remote access and support for connecting to company and school networks with Domain Join.

LICENCE TO LICENCE

In multiple-user environments, however, retail licences are relatively expensive and, because Microsoft puts strict controls on how particular instances of Windows 8 can be used, are inappropriate for volume licensing scenarios.

Those scenarios apply to the fourth version of Windows 8 – Windows 8 Enterprise – which is the most relevant for non-

consumers and small businesses, and is only available using Microsoft's volume licensing program, Software Assurance for Windows.

This program spans a broad range of usage models, which have long included plans for volume licensing employees, both at their desks and on their laptops while mobile.

The latest iteration of Software Assurance has been positioned rather differently than it was for Windows 7, though, to reflect the growing use of mobile devices and desktop virtualisation technology.

Desktop virtualisation in particular has been far more tightly



controlled in the past, when the Product Use Right (PUR) document explicitly allowed the installation of Windows 7 in virtual environments. The PUR now requires that users 'permanently assign each licence to a single device'. Further clauses confirm this refers to a physical device, not a software-based virtual machine. If companies need to virtualise their employees' desktop access, they can purchase a number of add-ons to the Software Assurance licence.

Anyone running Windows virtual desktop infrastructure (VDI) will need to buy the Virtual Desktop Access (VDA) Rights option to access those VDI images from any device that's not already covered by Software Assurance, which includes limited VDA rights for licensed devices.

In other words, you can access a VDI image from a laptop that's running its own version of Windows, but not from a thin-client computer that can't run Windows itself and accesses servers using something like the ICA protocol by Citrix Systems, for example.

Microsoft's Windows To Go option allows users to store a Windows image on a bootable USB stick, which can be inserted into any device that's already covered by a Software Assurance licence. This is a different approach to VDI, which runs Windows on a separate back-end server.

If users want to access VDI images from devices other than their Software Assurance-covered corporate laptop or desktop, they must buy Roaming Use Rights for each user. This fits in with BYOD strategies by allowing staff to access VDI desktops and Windows To Go images from personally-owned devices, tablets or even hotel business centres – all of which fall outside the normal scope of coverage for Software Assurance.

TABLET OPTIONS

A number of Windows 8 licensing provisions have been designed to cater for what Microsoft hopes will be the growing adoption of its Surface tablets.

For example, an option called Windows RT Companion VDA Rights allows users to access VDI images from a Windows RT-based device (a tablet like the recently released Surface Pro) without requiring an additional Software Assurance Windows licence. This effectively serves as a sweetener for organisations willing to commit to deploying Surface tablets.

The Microsoft Desktop Optimization Pack (MDOP) supports VDA environments with a range of management, deployment and troubleshooting capabilities to support large numbers of users in VDI-based environments. These tools will be a lifeline for any organisation struggling to enforce access controls in increasingly fragmented, mobile environments.

The last mobile device-related licensing option is a Windows Companion Subscription License (CSL), targeted at users who already have a licensed primary device. The CSL is also an enabler for BYOD, allowing users to access their corporate desktop, using VDI or Windows To Go, on up to four different devices – whether owned by the business or by the user. This is particularly useful for those who tend to use a variety of different devices (work desktop, home desktop, laptop and tablet) and want the licensing flexibility to access their workspace from any of them, at any time.

Rounding out Microsoft's range of Software Assurance add-ons is the Windows Thin PC licence, which comes as a smaller-footprint version of Windows 7 that can be deployed on older computers. This approach is designed to breathe new life into older systems, although it's only available on devices for which a Software Assurance licence has been purchased.

CLOUD & BEYOND

Companies considering such a rollout may be reluctant to commit to managing their business applications through Microsoft's Windows Store; for an additional fee, Microsoft offers an option called Enterprise Sideloading of Windows 8 Apps. This allows companies to maintain their own app stores



Microsoft's Enterprise Sideloading of Windows 8 Apps option allows companies to run their own dedicated app store for users, with a limited selection of apps, avoiding potential sensitive data leaks.

for users, limiting the selection of apps and avoiding the possibility that sensitive data may be leaked by the use of unauthorised apps.

That's just one example of how the increasingly fluid definition of the corporate desktop has changed software strategies. Indeed, the growing use of cloud-delivered applications will force many organisations to completely revisit their Microsoft licensing. If many users can accomplish most of what they need to do using Google Apps or Microsoft's Office 365, for example, there's no need to license an entire copy of Microsoft Office for that user.

Microsoft knows this, of course, and has crafted licensing arrangements that recognise the changes that cloud applications have wrought. If you're considering your Windows 8 licensing, weigh up the relative benefits of replacing some applications with their cloud equivalents.

"As far as cost effectiveness goes and bang for buck around cloud services, Microsoft services are pretty much where you would want to look," says Campbell.

"There are lots of nuances within the enterprise agreements, but the bulk of those nuances are not new. We see a lot more caution on the desktop than we see on the server side – but in the end, it's all about the cost to deploy, the cost to manage and the risk if you have problems." **SDC**



EASIER TO BEAT RESTRICTIONS

Is BYOD the answer?

The January *APC* editorial (page 3) discussed some of the reasons why adopting a new operating system is difficult for large organisations that have to maintain work continuity. The large engineering companies I have worked for recently are struggling with the implications of moving away from systems based on Windows XP, IE7 and Office 2003, let alone upgrading from Windows 7/IE9/Office 2010. But Windows Vista marked a significant break, when the capabilities of the systems at work started to fall behind the system capabilities available to home users. Recent changes – such as the development of social media, integration of cloud-based storage and the use of 'Bring Your Own Devices' (BYOD) – at work may finally offer the potential to overcome the restrictions of the corporate systems and allow a more flexible response to future system developments.

Joe Aiken

WINDOWS 7

I just wanted to say I've been picking up your mag for some time now and I can say that I'm pleased you guys are still supporting Windows 7. Having switched to Windows 8 and back again, I think Windows 7 will be still around for some time yet – I use it on my gaming PC and work laptop. The Modern UI just isn't everyone's cup of tea. Anyway, keep up the good work and I like the Linux content that you include in the mag. Good to know you have some penguins in the *APC* Labs.

Matthew C.

GPU ENCODING

I read with interest your articles on using a GPU to perform video encoding (*APC* January, page 90). As a long-time user of both Freemake and MediaCoder (I use them to encode TV programs for later viewing on my tablet), I find that using CUDA-based GPU processing gives me much of the same results as when I encode using purely the CPU.

Neither Freemake or MediaCoder allow two-pass encoding under CUDA, so the quality is not as good as CPU-only encoding (no big deal if you are only using it for catch-up TV and aren't all that fussy). The interesting thing is that while a CPU-only encode uses 100% of the CPU, a CUDA encode only uses about half of the CPU and half of the GPU. Surely using all of the resources would result in a faster encode? This is quite annoying.

Contacting the developers of both has yielded little in the way of fixes. I can get the machine to use all its resources by having two instances of each running, but this is only useful if you have more than one file. Poking around the net I find that most people with a high-end CPU don't bother with GPU encoding, as it results in inferior quality and is actually slower.

Depending on which CPU you have, there may be little or no benefit using GPU encoding at all.

Peter Mosser

FROM THE INTERNET

I just want to register my thanks and my annoyance for the way that you identify people as being 'from the internet'. Every time I read this it gives me a little chuckle as I imagine a race of people living in masses of cabling, all of whom are constantly offering their opinion in forums because there is nothing more that they can do with their lives. Then I am reminded of myself and become quite sad... Please think of a better location for these creatures of the 1nt3rw3bz.

Sincerely, Konrad, resident of the internet

Editor replies: Hi Konrad, adding a person's location has become fraught in recent times, since most of our email does come from the internet now rather than actual letters, and many writers do not want to reveal their location for privacy reasons. As a result of this and your timely letter, we'll now simply publish the names of the writers. **END**

EPINIONS@APCTEST.COM

Come on, have your say!

We want to hear what you think. Add to these discussions or email your views (in fewer than 250 words) to epinions@apctest.com. All correspondence becomes the property of *APC* and is subject to editing. Letters must include full name, street address, suburb, state and phone number to be considered for print publication. Address and phone details will not be published.



NOT SO DUMB USERS

Next time a non-techy friend asks a dumb question about using a tablet, remind them orangutans can operate iPads. And so can gorillas. And dolphins.

There's really no excuse for anyone who has trouble using a tablet, or getting apps on it to work. Since the news broke last year that orangutans at Miami Zoo were using iPads to play and communicate, more examples involving apes and fish using tablets have surfaced.

We're not talking YouTube videos of cats and frogs and birds pawing mindlessly at moving objects on iPad screens, but real interaction and communication between zoo animals and their human handlers. Miami Zoo staff revealed they used iPads to find out what kind of food the orangutans wanted to eat. Using software designed for autistic children, the orangutans were able to order food and in the process, showed they could pick out objects on the screen and articulate what they wanted. They were reportedly even able to identify body parts, although for what reason we're not sure. Even more fascinating was that the younger orangutans were far more interested in the devices than the older orangutans, learning to use them faster and being more at ease with them. Does that sound familiar?

Since the Miami Zoo revelation, another zoo in the US pointed out that of its orangutans not only used iPads, but up to 10 different apps on each! These included games, drawing programs and even virtual musical instruments. The iPads were provided to the orangutans by an initiative called Apps for the Apes, run by the conservation organisation Orangutan Outreach, which hands out tablet devices to intelligent primates in zoos in the US. It's doing this in an effort to protect the

primates from extinction, believing that demonstrating they can use iPads will highlight the similarity of apes to humans. Orangutan Outreach's next goal is to provide Wi-Fi for the iPads so that the orangutans can make FaceTime calls to orangutans in other zoos (seriously, we are not making any of this up).

Clearly the superior intelligence of apes in the animal kingdom gives them a head start with iPads, although dolphins are not far behind. Researchers at a dolphin centre in Mexico have been teaching a dolphin called Merlin how use its nose to operate a waterproofed iPad with touch. The researchers are from an organisation called SpeakDolphin, which is trying to decipher dolphin language. Merlin was asked to match physical objects with their representation on the screen and did so with ease. The researchers hope to continue their work to develop a dolphin alphabet of symbols, which the dolphins appear to recognise and respond to.

All this clearly represents an opportunity for developers looking to become millionaires by creating the next big thing: an app that lets people communicate with their pets. What cat owner isn't going to buy an app that lets them chat with their moggy? Although with cats not the sharpest members of the feline family, this could pose a serious challenge for even the brightest developers. But as the orangutan and dolphin experiments show, the future is clear: thanks to the iPad, you can look forward to a time soon when you can make a FaceTime call to your partner, and then ask for your pet to be put on for a chat, too. **END**

ENDUSER

Share the hilarity!

Do you work in the IT industry and are forced to deal with inept and clueless end users on a daily basis? Do you have an IT professional, who isn't that 'professional'? If you have an interesting or amusing story, email us at contact@apctest.com. All correspondence becomes the property of APC and is subject to editing. Letters must include writer's full name, street address, suburb, state and phone number to be considered for print publication. Address and phone details will not be published.

XBOX 360 TECH

INSIDE MICROSOFT'S KINECT

This month we dissect Microsoft's motion-detecting Kinect controller for the Xbox 360.

BACKGROUND

Microsoft's motion-sensing device makes it possible for users to touchlessly interface with either an Xbox 360 game console or a Windows PC. The horizontal row of motion and voice sensors sits atop a motorised, pivoting base. Here's how it looks inside.

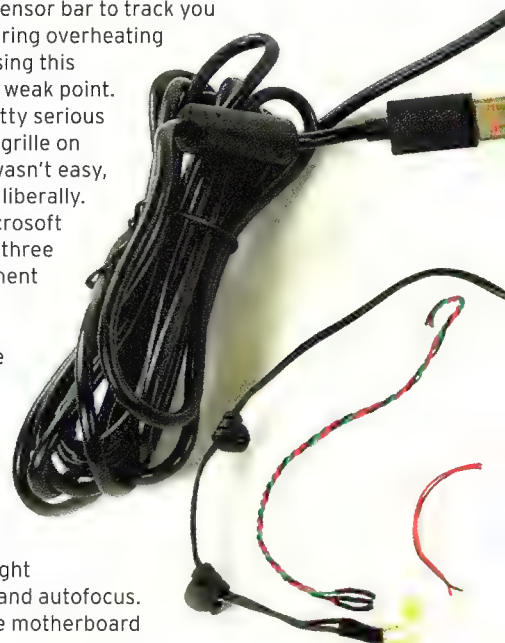
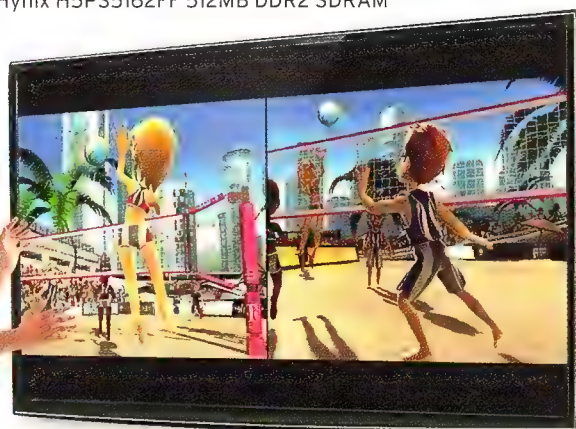
MAJOR TECH SPECS

- Wolfson Microelectronics WM8737G stereo ADC with microphone preamp
- Fairchild Semiconductor FDS8984 N-channel PowerTrench MOSFET
- NEC uPD720114 USB 2.0 hub controller
- Marvell AP102 SoC with camera interface controller
- Hynix H5PS5162FF 512MB DDR2 SDRAM

- Allegro Microsystems A3906 low-voltage stepper and single/dual DC motor driver
- ST Microelectronics M29W800DB 8MB NV flash memory
- PrimeSense PS1080-A2 SoC image sensor processor

KEY FINDINGS

- The base has a tiny motor that's about the size of an American quarter, with three fragile plastic gears (the motorised base can rotate the top sensor bar to track you as you dance around the room). Barring overheating issues with the top unit, we're guessing this motor assembly will be the Kinect's weak point.
- With a metal spudger and some pretty serious prying, we were able to remove the grille on the bottom of the sensor bar. This wasn't easy, as Microsoft applied adhesive quite liberally.
- Kinect's slim form factor forced Microsoft to split up the main board, stacking three boards vertically like a small apartment building.
- There's a fan at the far end of the Kinect. It's aligned to suck air in one side of the Kinect and push it out the other.
- After removing several more screws, the two cameras and the IR transmitter easily lift off the metal backing bar. These aren't tiny mobile phone cameras – they're closer to the camera you might find in a webcam, with large lenses and autofocus.
- All four microphones connect to the motherboard with a single cable connector.
- The design is very modular, so replacing individual components (like the motor) when they fail shouldn't be a problem. There's also no soldering required to disassemble it.
- Microsoft has used four kinds of screws, including some hated security bits: T6, T10, T10 security and Phillips #0 screws. **EDIT**



SUBSCRIBE RECEIVE 3

The image displays three overlapping covers of APC (Australian Personal Computer) magazine. The central cover is the March 2013 issue, featuring a Cisco router and a laptop. To its left is the January 2013 issue, showing a tablet. To its right is the 'THE ANNUAL HOLIDAY' issue, featuring a person. A large red circular badge is overlaid on the bottom right of the magazine covers.

APC
March 2013
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- + We finish Rally the Army

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THE REAL WINDOWS

ASUS PROVES YOU CAN BUILD A FULL WINDOWS 8 TABLET FOR THE

8
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ASUS VivoTab Smart ME400C

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TABLET

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Full Windows 8 OS, lightweight design, 7-hour battery life. ✓

Netbook level performance, only 33GB usable storage. ✗

The VivoTab Smart is a Windows tablet that seems to offer it all. This is a full, unhindered Windows 8 device that's somehow managed to come in both lighter and cheaper than its iPad equivalent, plus it'll let you run all your desktop apps and has a battery that lasts a full working day. However, if that's left you scrambling for a pen and asking 'Where do I sign up?', can we humbly suggest holding that thought for a moment – there are still quite a few caveats here.

THE TABLET PROBLEM THUS FAR

Tablet PCs are, in many respects, victims of their own design. Having an interface that can be driven using just your digits does demand some simplification of the interface. While being simple might equate to ease of use, there are still plenty of occasions where complexity and the power it offers is needed – it's the difference between trying to edit and manipulate images in Microsoft Paint versus Adobe Photoshop.

If you've tried to use one of today's 'simple' tablets for prolonged work or intricate productivity tasks, you may have come to the realisation that traditional PCs and laptops still have a vital role to play. As much as we might love the idea of a smart, easy-to-use and highly portable tablet that allows us to do everything, the reality is that stabbing at a screen with your fingers is nowhere near as efficient or precise as using a mouse (or trackpad) and keyboard with a traditional PC.

THE NEW STANDARD BEARER?

With that caveat in mind, Windows tablets do theoretically hold some potential to break that paradigm – certainly more so than their iPad and Android peers. With Windows 8's discrete desktop and tablet (a.k.a. 'Modern UI') modes, there's the promise of power and flexibility when you need it, combined with a simple tablet interface for more casual use.

So can you really have one device that does it all?

The VivoTab Smart does undeniably make a very solid effort. ASUS has taken an iPad-like approach with the device, building a compact little Windows tablet that competes well with Apple's offering on paper. At 580g, it's light and



comfortable to hold, but with an Atom processor it still manages tablet-like battery life with a sub-\$600 price tag.

The build quality is generally sound, with a bright and clean IPS screen at the same lowish 1,366 x 768 resolution of other Windows tablets. Unlike most of its VivoTab kin, the Smart uses a plastic rather than metal chassis.

THE LAPTOP REPLACEMENT

ASUS has a solid reputation for creating hybrid tablets, although the Smart is genuinely a standalone device. In order to effectively use it with Windows' desktop mode, you'll really need to add two 'optional' accessories: a magnetic snap-on cover and a matching wireless keyboard.

The former works in a similar way to Apple's iPad Smart Covers, letting you fold it around and behind the tablet to act as a stand, although Apple's patented design has clearly led ASUS to opt for crazy origami-style folding mechanisms.

The keyboard is a fairly compact Bluetooth number with chiclet keys. These are generally a nicely usable size with one or two exceptions, as is the trackpad, which is substantially bigger than the equivalent on Microsoft's Surface RT tablet. The whole keyboard is actually designed to magnetically snap onto the inside of the cover; it's securely sandwiched between the tablet and cover when the latter's closed.

To use this three-piece kit like a laptop, you need to jump through some hoops, first detaching the keyboard and then performing some cover origami to get the tablet propped up. It's possible to use the keyboard while it's still attached to the cover, but that leaves you nothing to prop the screen up with.

TABLET

PRICE OF AN IPAD, IS IT ANY GOOD?

The VivoTab Smart has a full Windows 8 OS.

The Bluetooth keyboard is fairly compact, with chiclet keys.

MANAGED EXPECTATIONS

We found that living with the Smart was ultimately a case of managing your own expectations. 'Netbook' is a word that's left a sour taste in many tech enthusiasts' mouths, but that's about the level of computing you're getting from the Atom chip and 2GB of memory that power the VivoTab Smart. Its new dual-core Z2760 processor does offer improved performance when compared to its forebears, but there's still a wide gap between it and even an entry-level Intel Core i3 processor.

Desktop multitasking is certainly doable, but push things too far – say, by running more than three or four apps – and things will start to slow down. Scrolling in web pages can get stuttery and launching apps or opening downloads often involves pauses of 5 to 30 seconds.

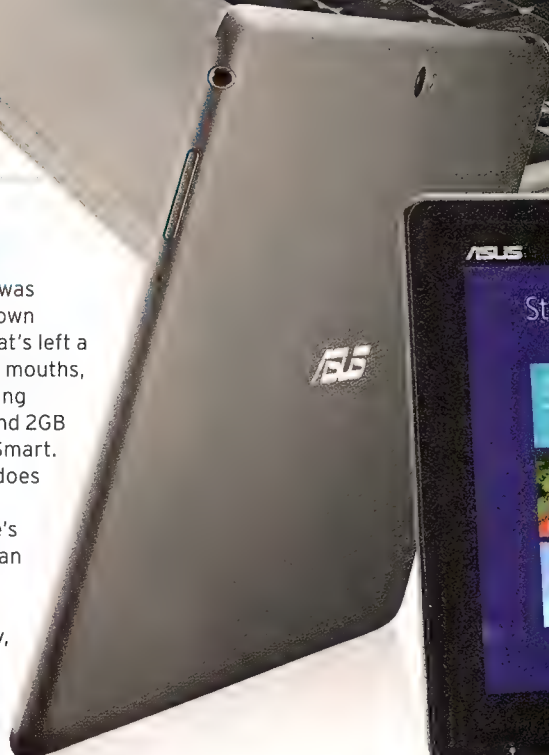
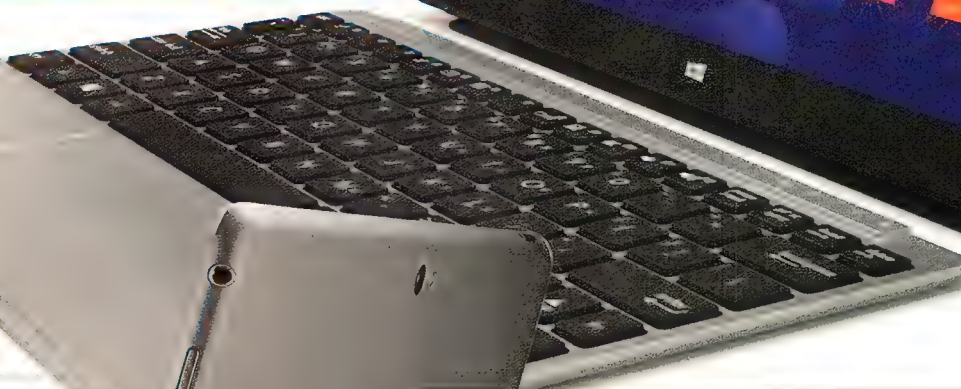
The other downside is storage; despite having 64GB of flash storage onboard, after Windows and its recovery partition have taken up their share, there's just 33GB of free space left. That's fine for installing Office and other basic productivity apps, but start downloading multi-gigabyte games from the Microsoft Store or larger multimedia creation programs and you'll run up against that limited storage in no time at all.

Basic gaming is more than possible, thanks to a PowerVR SGX545 graphics chip, but it's only a single-core one. (The iPad 4's quad-core PowerVR SGX554 is around two to three times faster.)

THE TABLET FIGHT

Rated purely as a tablet, the Smart does struggle a little. A lot of that comes down to the immaturity of the Windows tablet ecosystem when it comes to the variety of apps and games available, though this is slowly and steadily improving as the months go by.

It's generally competent when it comes to general tasks like watching videos, surfing the web or reading books, but the higher-resolution screens on the best iPad and Android tablets to make them crisper.



The IPS screen is the typical 1,366 x 768 resolution.

Considering its compact size, low weight and general flexibility, the Smart's battery life is reasonably impressive. It lasted 7:10hr in our video playback test, which should see most people through a full working day. If you want to switch to tablet mode for some after-hours media consumption, you'll need to charge it up again for a couple of hours.

HORSES FOR COURSES

Compared to even a cheap laptop, it's hard to escape from the fact that this tablet doesn't have much memory, storage or processing power. What works in the Smart's favour is that neither do any of its peers and moreover, most of them are considerably more expensive.

If you can live within its limitations, this is a tablet that can let you be more productive than an iPad or Android equivalent and it's not terrible value considering the rest of the market. But, there's clearly still some way to go before that 'single computing device' dream becomes a reality.

Dan Gardiner



7 10 **ASUS VivoTab TF810C**

The VivoTab Smart's got a bigger brother.

TABLET

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Up to 16 hours of battery life, solid build quality. ✓

Underwhelming performance considering the premium price. ✗

The TF810C is one of three new Windows 8 tablets from ASUS and the last to come through APC Labs. In essence it's the bigger brother to the VivoTab Smart we've reviewed on page 22. Bigger is quite literal here because it comes with a larger 11.6in screen (although still at 1,366 x 768 pixels), which in combination with a superbly solid keyboard dock, allows it to compete more effectively against petite laptops like the 11.6in MacBook Air or ASUS's own mini Zenbook.

As with the Smart, you're getting the genuine full version of Windows 8 here, not the cut-down tablet-only RT edition, which means the bulk of your existing Windows programs will run on the TF810C straight out of the box. That bigger footprint means you have to accommodate some additional weight, with the tablet coming in at 675g. In this slightly larger size that's still fairly well balanced – while we wouldn't want to be holding it up for extended periods, for short jaunts it's not uncomfortable. Carry weight is a slightly different matter; the dock adds a further 665g for around 1.34kg all up, which makes it a compact yet hefty little unit. To put things in perspective, ASUS's 11.6in Zenbook weighs in at only 1.1kg.

Along with that slightly bigger physical size is also a bigger price tag. It does make at least some attempt to compensate for this, with a brushed aluminium rear panel that provides a more premium and robust feel when compared to the Smart. The keyboard is well constructed, sporting an aluminium shell that makes it feel virtually indestructible and the chiclet keys have decent spacing between them, making it easy to find the edges and avoid mistyping. The addition of a Wacom stylus also means you can scribble notes or even draw and sketch, though we wish there was somewhere to stow it in the tablet.

The TF810C's real standout feature, and the one that could make it a better option than any ultrabook for some users, is its all-day battery life. With a built-in battery that's 20% bigger than the VivoTab Smart's, at 50% brightness the tablet lasted an admirable 9:11hr in our video playback test. That's not quite iPad good, but considering the extra flexibility the full version of Windows offers, we think that's a fair trade-off. Moreover, when slotted into the keyboard dock (which also provides a second battery), the total runtime edged just over 16 hours. That's a genuinely astonishing result – the best we've ever seen for a Windows machine.

Unfortunately the cost of that long battery life is limited processing grunt, with the same underwhelming Atom chip, 2GB of memory and 64GB of storage (33GB left over when Windows is installed) running the show here as on the smaller Smart. That doesn't just affect intensive application use, but some of the general responsiveness of the OS – apps take longer to launch and multitasking tends to bog things down. It will do a serviceable job if all you need is a basic machine for day-to-day work like web surfing, word processing and the occasional bit of image editing, but processor-intensive tasks like encoding multimedia can involve a lot of waiting.

That comparatively meek level of performance is more forgivable in the VivoTab Smart – it's considerably cheaper and doesn't really seek to compete with smaller ultrabooks.

As hybrid tablets go, the TF810C does certainly have its charms, not the least of which is that astounding battery life. But at this premium price, a little more speed would have been nice – even if it came at the cost of some on-the-go runtime.

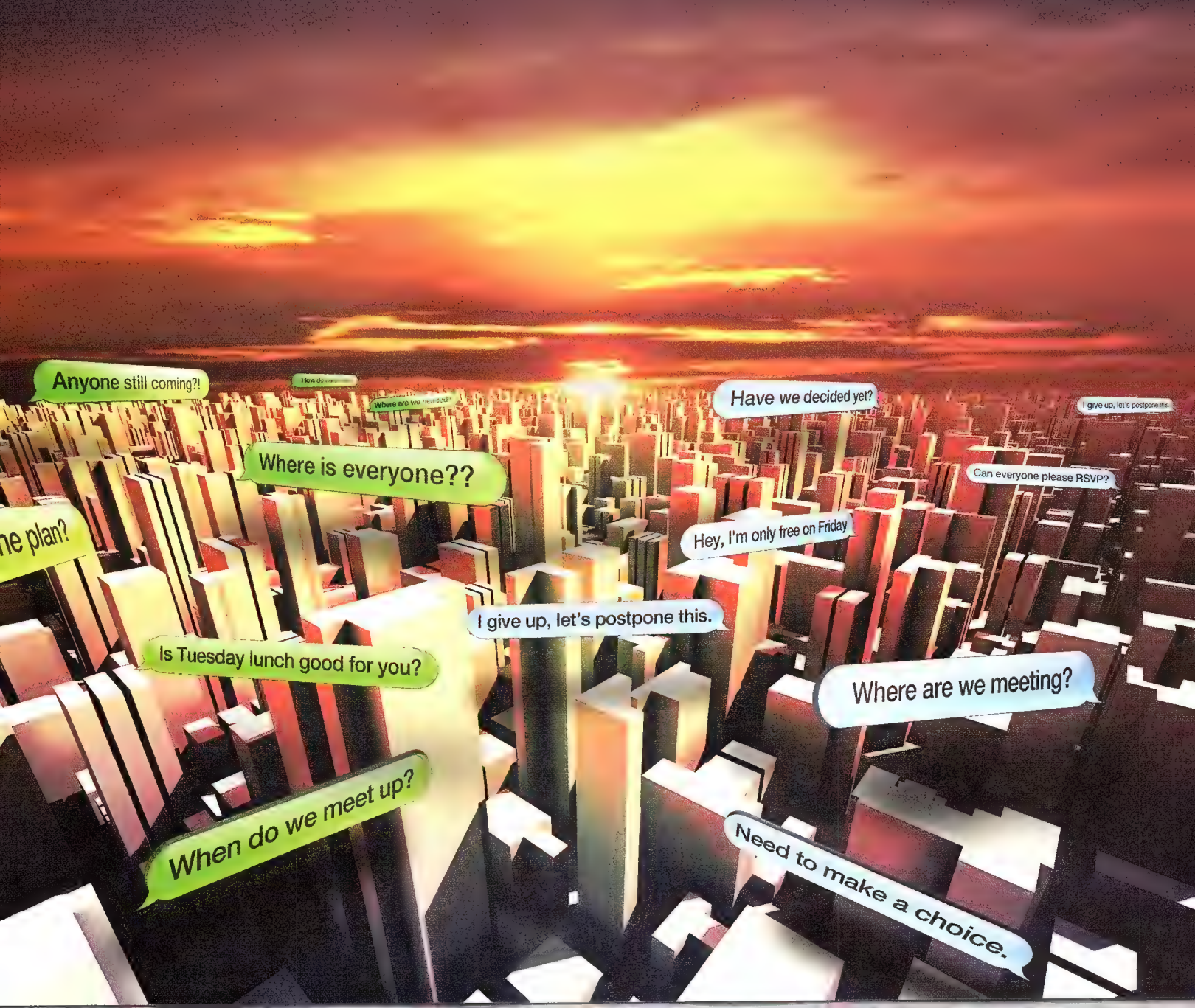
Dan Gardiner



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7 **10** **Lenovo ThinkPad Tablet 2 3G**

Lenovo chases business users with this super compact Windows 8 tablet.

TABLET

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\$1,069 \$

Includes stowable stylus, slim and lightweight build, USB and micro-HDMI ports. ✓

Still only netbook performance. ✗

The slow trickle of full Windows 8 tablets we've seen since October has seemingly just turned into a flood, with Lenovo the latest big name to gleefully throw itself into the current. The business-oriented ThinkPad Tablet 2 3G has a plain name and an equally plain design, sporting Lenovo's trademark matte black plastic chassis and the same Atom-based internals as the ASUS models we've also tested this month. This means that predictably, it's only really fast enough to handle the basics: office apps, web, email and the like. As with the ASUS tablets, doing anything CPU-intensive is a slow process that will almost inevitably involve some waiting.

That shortcoming aside, the Tablet 2 is reasonably well designed and thought out overall. The 565g weight and 9.8mm thickness make it one of the smallest and lightest full Windows 8 tablets you'll find, and unlike the VivoTab Smart, it packs a built-in USB 2.0 port and a micro-HDMI output. Those are two very useful features that significantly increase the unit's flexibility, with USB letting you quickly plug in peripherals or storage, and HDMI output means easy docking to a monitor, or jacking into a projector for quick boardroom presentations. (A quick word of warning, though: that USB 2.0 port doesn't output a lot of power and we had problems getting USB hard drives to actually power up using it. Flash-based drives worked fine, however). Likewise, battery life is predictably great – 8:39hr is fantastic at this small size and weight.

The included stylus (with a built-in slot for it) also enhances the overall usability. By default, the Tablet 2 lacks a keyboard, so a stylus makes driving traditional Windows programs a lot easier. The desktop side of Windows 8 really isn't designed to

be interacted with using something as imprecise as a finger (no, not even your tiny pinkies), so having the fine tip of a stylus lets you more easily navigate smaller menus, and it also makes it simple to do things like highlight and select text to cut, copy and paste.

You do have the option to add a proper tactile keyboard and a separate dock, though grabbing both will set you back a further \$149 and \$99, respectively. We'd consider those a must-have if you want to use the Tablet 2 for prolonged deskbound work sessions, but they do send the Tablet 2 dangerously close to ultrabook territory; for this 3G model, you're looking at over \$1,300 for the full package.

On the other hand, 3G support is something we could take or leave. It's neat to have the option (and neither of the ASUS tablets offers it), but it's relatively easy to tether to a smartphone these days; that'd let you forgo the extra expense of a mobile data plan and with a 4G phone, you'd have faster and more responsive data connectivity. Sans 3G, the same model Tablet 2 goes for a slightly more reasonable \$919. That's still a premium price, but not so deep into high-performance laptop territory as to make it unreasonable.

On the whole, it's encouraging to see that Intel finally has a chip that can (almost) compete with the ARM-driven Android and iPad tablets when it comes to battery life. It's a bit of a shame that performance is the cost. It's more than likely we'll see some better-balanced options with Intel's mid-year architecture refresh (codenamed Haswell) that's due around June. Until then, it could be the case that Windows 8 tablets will, figuratively speaking, just be treading water.

Dan Gardiner



9/10 Sapphire HD 7870 XT

The best little card around for under \$300.

COMPONENT

www.sapphiretech.com @

\$269 \$

AMD Tahiti LE GPU, ✓
excellent price.

None. ✗

The HD 7870 XT uses AMD's top-end Tahiti GPU, albeit a cut-down version. The fact that it does so in a card that's less than \$300 seems impressive, but is it a cut too far? The combination of impressive price and top-tier performance ought to mean that AMD's partnership a shedload of these cards and they deserve to, because this Sapphire HD 7870 XT is an excellent card.

That Tahiti LE GPU is essentially the same chip we've seen in the HD 79XX-series cards and is running at the same speed the original HD 7970 debuted at before the GHz Edition landed. The difference is that AMD has shut down a chunk of the silicon, so it's running 1,536 shaders compared to the 2,048 and 1,792 cores of the HD 7970 and HD 7950. There are fewer Texture Units, too, and Sapphire has chosen to pair up the standard HD 7870 memory back end with the Tahiti LE GPU. That means you have 2GB GDDR5 running at 6GHz on a 256-bit bus.

In terms of performance, there's nothing under the \$450 price tag of the GTX 670 that we'd recommend over this impressive little card. The GTX 660 Ti is now looking even more sluggish, and even the HD 7950 is suddenly really struggling to justify itself. Sure, the slightly higher-spec Radeon is faster, but only by a few frames in our benchmarks.

We also put this Sapphire card up against an overclocked HD 7870 and it's considerably faster across the board, even at the HD 7870 XT's stock settings. Sapphire's usual excellent cooling does a great job of keeping both the chunky GPU (it's getting on close to twice the physical size of the Pitcairn silicon) running cool and keeping the entire card running quietly.

You can also overclock the hell out of this chip. From the starting point of 925MHz, we were able to easily push the card up to a stable 1,200MHz. We're pretty sure it could go further too, but at that speed it was still relatively quiet compared to the AMD reference cooler and managed to deliver HD 7950-beating performance figures.

The fact that for less than \$300 you can pick up a graphics card that runs most contemporary games at very playable frame rates – with all the DirectX 11 post-processing cake you can eat – at the ludicrous 30in resolution of 2,560 x 1,600 is incredible. There's now such a huge amount of graphical horsepower available to PC gamers that we'd struggle to justify spending more than this on a graphics card. For now – and possibly for the next year or so – this is all the graphics card most of us are going to need.

Dave James



Apple iMac (2012)

Can't decide between the 21.5 and 27in models? We've tested them both.

ALL-IN-ONES

- www.apple.com.au/mac @
- \$1,429 (21.5in), \$1,999 (27in) \$
- Good value for money, great industrial design. ✓
- No expandability in 21.5in version, sacrifices made for good looks. ✗

Apple updated its iconic iMac line of computers late last year, switching to Intel's newest Ivy Bridge CPUs, eschewing an optical drive and adopting an ultra-thin edge design that, at first glance, fools you into thinking the entire computer is wafer-thin. It isn't, but more on that later.

We tested the 21.5in iMac with a 2.7GHz Core i5 CPU that can use the Ivy Bridge's Turbo Boost mode to get up to 3.2GHz. We also tested a 27in model with a 3.2GHz i5, which can hit 3.6GHz with Turbo Boost. These are impressive numbers, so for the sake of reference, we benchmarked them against 2011's 27in Sandy Bridge iMac with a 3.4GHz Core i7 CPU. None of the machines included Apple's Fusion Drive, a hybrid SSD/mechanical drive that, according to Apple, automatically optimises itself to ensure the applications you most commonly use will run as fast as possible.

For testing, we used both GeekBench 2 and NovaBench. GeekBench focuses on CPU performance and 2D graphics, while NovaBench looks at 3D graphics and hard drive performance. We ran both tools five times on each machine, tossed away the highest and lowest results, and averaged the remaining three. Our results are in the graphs above.

From a design perspective, the 2012 iMac looks much like 2011's from the front. Really, there hasn't been a major change to the iMac design since the iMac G5 was introduced in August 2004. I guess Apple thinks it ain't broke, so why fix it?

The only change is a radical narrowing of the back of the computer as it approaches the edges, giving the impression of a much thinner device. It's purely aesthetic, as the actual desktop footprint of the machine is the same, or only very marginally smaller. It has a consequence, though: the new

BENCHMARK RESULTS

GeekBench

0 3,000 6,000 9,000 12,000 15,000

Apple iMac 27 (2011) with 3.4GHz Intel Core i7 (Sandy Bridge), 16GB RAM	12,785.6
Apple iMac 21.5 (2012) with 2.7GHz Ivy Bridge Intel Core i5, 8GB RAM	9,207.6
Apple iMac 27 (2012) with 3.2GHz Intel Core i5 (Ivy Bridge), 8GB RAM	10,316.3

NovaBench

0 300 600 900 1,200 1,500

Apple iMac 27 (2011) with 3.4GHz Intel Core i7 (Sandy Bridge), 16GB RAM	1,456
Apple iMac 21.5 (2012) with 2.7GHz Intel Core i5 (Ivy Bridge), 8GB RAM	815
Apple iMac 27 (2012) with 3.2GHz Intel Core i5 (Ivy Bridge), 8GB RAM	996

21.5in iMac lacks the slot on the bottom where RAM cards could be slotted in. This means you must buy as much RAM as you need at the time of purchase, which is a bummer. Apple charges significantly more for RAM than most places, so our advice has usually been to buy a minimum spec of RAM from Apple and then upgrade from a reputable third party. For the sake of a thin edge that you'll hardly ever see, Apple has locked out that option. That's a shame.

We're also not convinced about dropping the optical drive. Maybe we're dinosaurs, but we don't yet buy all our music from iTunes nor all our software from the App Store. And we still like to burn home movies onto DVD to send to relatives, rather than making them download them. Again, for the sake of a thin edge, Apple wants you to buy an extra box – an external SuperDrive – to take up space on your desk. Dropping the floppy in 1998 was prescient, but dropping the optical drive altogether in 2012 seems a tad premature.

Overall, it's not a machine I'd personally buy. Well, not yet at least – my habits may change. If you're a truly wireless, download-only sort of person and have no interest in adding extra RAM to a machine you'll proudly show off to your friends (from the side), then the 2012 iMac looks pretty good.

Mathew J. C. Powell



9/10 Razer Sabertooth Elite

Unlevel the playing field? Don't mind if we do...

PERIPHERAL

au.razerzone.com @

\$119.95 \$

Extra buttons, gamepad can be customised. ✓

Somewhat pricey. ✗

The Sabertooth isn't Razer's first stab at a gamepad – last year's pro-focused Onza pad included analogue sticks with adjustable torsion – but the Sabertooth does something more. This time the focus is on extra buttons (between two to six of the things) and a pretty advanced on-pad system for customising them.

Mounted in the centre of the Sabertooth's underside is a pair of trigger rockers that cover two inputs each. They're raised so that they can be easily reached with whichever fingers you hook around, and are perfectly placed to either replace or augment the standard face buttons when your thumbs are occupied with the analogue sticks.

We fared best using them with index and middle fingers, though their flexibility means it's entirely up to you how you interact with them – or if you want to use them at all. Razer has made the Sabertooth's rear rockers detachable and has included silicon covers to fill the voids they leave behind.

The other additional buttons sit on top of the pad, between the bumpers and the triggers. They're easy to reach with the tips of the index fingers, even if they're otherwise occupied with the bumpers. All the extra buttons are programmable through the onboard OLED screen and can represent any digital input you like.

The Sabertooth stores two different configurations and there's even a button dedicated to profile switching, so it can be done on the fly.

There's a slight issue, however: the program button sits directly below the right analogue stick, and our sausage

thumbs managed to activate it accidentally more than once in the heat of gaming. You'll need to adjust your handling at least slightly, though we suppose that's to be expected when transitioning from a standard gamepad to an advanced peripheral like this.

The box crows about adjustable analogue stick sensitivity, although we couldn't find such an option. Thankfully the Sabertooth's sticks are perfectly weighted and a joy to use – just slightly stiffer than the standard Xbox pad. There are bright green rubber caps in the box that increase their stickiness at the expense of a little aesthetic beauty.

We should also mention the face buttons, an optionally backlit quartet that Razer calls 'hyper-responsive'. Micro-switched with minimal travel, they're a great improvement on the Microsoft pad's somewhat spongy inputs.

In fact, almost everything – from the detachable braided cable (an absolute must in tournament-level gaming) to the included carry case – puts the Sabertooth on a plane above the standard pad, and we reckon it's probably the best third-party pad out there.

So do you need one? It's superior, but it's superior to an already very high standard. If you're not a super-competitive gamer, the Sabertooth may be an unnecessary expense.

We used it over the course of a month and while it made our FPS experience slightly more convenient, we're not convinced it led to a real improvement in results. Of course, your results may vary.

Alex Cox



7/10 Mad Catz S.T.R.I.K.E. 5

Not quite so mad as its big brother, but it's definitely on the spectrum.

PERIPHERAL

www.cyborggaming.com @

\$229 \$

Configurable, useful
OLED screen. ✓

Very expensive. ✗

Mad Catz S.T.R.I.K.E. 5 is the inevitable cheaper little brother to the impressively mad S.T.R.I.K.E. 7. Well, I say cheaper, but it isn't *cheap*. It's still hitting the shelves at around \$229, which is a lot of cash to drop on any gaming peripheral and really only something to think about if you've already bought every single other performance component that could help your rig. After all, you could buy an awesome graphics card for that much cash and still have change.

So what's missing in this cut-down version? Well, I'm not entirely sure that you're missing very much at all. The big feature of the S.T.R.I.K.E. 7 was the V.E.N.O.M. touchscreen interface module and I have to admit that I wasn't a big fan of the resistive technology it employed, or the lack of any meaningful or useful applications for it. Mad Catz has said that it's been in touch with publishers and developers with the SDK, and is expecting new applications to come through. We're still waiting.

However, the E.Y.E. OLED module here is actually a little more functional out of the box. The nine numbered buttons aren't particularly inspiring and also seem a little flimsy, but they're simple to program and use. The little OLED screen in the E.Y.E. can show a range of different things, from the mic and speaker volumes to the icon of whatever app you've programmed it to open with a flick of a switch. The feel of the physical buttons aside, I'm actually really impressed with how functional the E.Y.E. module is and I think I prefer it to

the V.E.N.O.M. touchscreen because of its usefulness.

The rest of the board is much like the S.T.R.I.K.E. 7. This means you're limited to rather dead-feeling membrane-switch keys, but although they're not too nice under your fingers, they're very responsive when you're gaming. The S.T.R.I.K.E. 5 also has the modular approach of its brethren, allowing you to configure the keyboard in a variety of different ways, depending on the space that's available or your dominant hand. I have to say I like the way you can cut it down to be a very functional compact keyboard by removing the number pad; however, without that side panel you also lose any cursor keys, which might be an issue for you.

While I do appreciate the design ethos behind the S.T.R.I.K.E. range, I'm not a massive fan of the aesthetic and I'm definitely not as blown away by it in day-to-day use as I am by the – admittedly far more expensive – Razer DeathStalker Ultimate.

Strangely, I think the S.T.R.I.K.E. 5 is a more useful option than the S.T.R.I.K.E. 7, but if I was going to spend this sort of money on any keyboard, I wouldn't hesitate to look more closely at the Razer offering instead. And if I couldn't stretch that far? Well, the Gigabyte Aivia Osmium is around \$139 and is one of the finest mechanical-switch keyboards that I've had the pleasure of playing with, and that's despite its lack of touchscreen.

Dave James



8/10 Razer DeathStalker Ultimate

Can Razer's top-end board really justify that price tag?

PERIPHERAL

au.razerzone.com @

\$280 \$

Touchscreen offers great functionality, responsive keys. ✓

Ridiculously expensive. ✗

You wait all year for a super-expensive gaming keyboard with touchscreen controls and then two turn up at once. Following hot on the crazy-priced heels of the Mad Catz S.T.R.I.K.E. 7 comes this ultra-stylish, ultra-techie riposte from peripheral guru Razer.

Like the S.T.R.I.K.E. 7 it comes with a touchscreen interface, but aside from that and the bulging price, they're almost entirely different takes on the gaming keyboard.

Whereas the Mad Catz look is all rounded-off angles, Meccano-like configurability and stealth fighter chic, the DeathStalker Ultimate is a matte black slab of stylish gaming goodness. The chopped-off corners stop it from being a plain rectangle, but the flat frame and low-profile chiclet keys give it a more subtle look than the Mad Catz board. That said, you've still got the multicoloured LED backlight shining through the keys, and your eye will always be drawn to the touchscreen trackpad that sits where the numpad ought to live.

That trackpad almost manages to justify the DeathStalker Ultimate's enormous price. The S.T.R.I.K.E. 7 had potential (if its developers managed to get something interesting out of its resistive touchscreen, which they still haven't), but the Razer has impressive functionality right out of the box. My Windows installation recognised it as a trackpad even before I installed the Synapse 2.0 software from Razer.

Once the Synapse application is in there, things get even better. There are already various interesting little tools for

the 4in screen including YouTube, Twitter and Facebook apps, as well as a Gmail client. These all load on the touchscreen itself like smartphone apps.

For gamers with a single panel, this extra screen is fantastically useful. You can keep tabs on the social world and watch videos of Colonel Meow without having to leave your game. There's even a rudimentary web browser that stays separate from your Windows session. You also have stopwatch and clock functions, although my favourite is the screenshot button. In screenshot mode you can press a button to capture an image, view ones you've already shot and upload them to Facebook – all without exiting a gaming session. These dynamic keys can also be configured separately, allowing you to add icons and program functions yourself.

It's by no means perfect, though, which is a shame given the price. In certain USB ports the screen and buttons had visible artefacts in them, and my PC would occasionally boot without the touchscreen active. But for the most part the DeathStalker works well and its extras are genuinely useful. I'm still not a fan of membrane-switch keyboards, but the chiclets are very responsive, if loosely built.

There's no way I can really talk about the DeathStalker Ultimate in terms of value for money; however, it really is a thing of beauty. If you can spend this sort of cash on a very functional peripheral then this is definitely the top-end keyboard of choice.

Dave James



8/10 Fractal Design Node 304

One of the best ITX-supporting cases we've seen.

COMPONENT

www.fractal-design.com @

\$129 \$

Fits standard ATX PSUs and graphics cards, supports up to six hard drives. ✓

Can be a tight squeeze for some components. ✗

One area that has seen substantial growth over the past 18 months is the mini-ITX case market. The realisation that these mini-motherboards can be the basis for some pretty powerful PCs has started to dawn on people, not least the chassis manufacturers.

Swedish case designer Fractal Design's Node 304 is aimed solely at the mini-ITX market, but boasts hard drive support that could have it being used as a file server or a large multi-disk NAS unit. It also has the serious advantage of supporting standard ATX power supplies and graphics cards, albeit with a few provisos in the dimension stakes.

Built with the usual Fractal Design high quality and attention to detail, the Node 304 has a very distinctive look thanks to its solid aluminium front bezel. The first thing you'll notice is the lack of support for an optical drive, but with our large digital download libraries, that's a diminishing requirement. The lower right-hand side of this bezel houses the power button as well as the I/O ports, which consist of two USB 3.0 ports and a couple of requisite audios.

Behind the front panel are two of the three preinstalled cooling fans. The front fans are a pair of Fractal's own Silent Series R2 92mm fans, which spin at a maximum of 1,300rpm. The third is on the rear panel and is once again one of its own Silent Series R2 fans, but this time a 140mm job (1,000rpm). The front two come with filters and there's a filter for the PSU as well, and they're all removable. All three case fans can be

connected to the three-speed fan controller that's included with the case.

Inside – undo the four thumbscrews and remove the cover – are three white drive cages, each holding two drives in either 3.5 or 2.5in formats. Yes that's right, an ITX case that can support six hard drives. The 3.5in drive mounts have rubber grommets fitted to help dampen down any noise.

There are a few things to be aware of when choosing a power supply and GPU. The case supports graphics cards up to 160mm long, although by removing one of the drive cages you can squeeze in a card that's 170mm (only if you use a shorter power supply). The same rules apply if you take out two of the drive cages to squeeze in a 310mm graphics card.

To get anywhere near a tidy build in the Node 304, a modular PSU is a must. The PSU is installed on its side and the one thing to note is that the case supports PSUs up to 160mm total depth for non-modular designs; for modular designs, you need to find units of a maximum of 140mm deep. There's room for CPU coolers up to 165mm tall, which allows for some quite serious third-party offerings, though a liquid chiller may make more sense.

The Node 304 has all the build quality and attention to detail that we've come to expect from Fractal. To get the best out of it, though, you need to pay attention to those limits on PSU and graphics card length.

Simon Crisp

8
10

Kyocera Ecosys FS-C8525MFP

The Big Mama of small office MFPs.

PRINTER

www.kyoceradocument
solutions.com.au

\$3,173.50

Duplex print and scan,
top-quality output,
mobile support.

Very heavy, so-so
documentation, free
apps require a licence
key, limited support
for online services.

Despite being supposedly designed for small to mid-sized offices, the FS-C8525MFP is a hefty piece of kit weighing in at 80kg with a footprint of around 60cm², excluding necessary clearances, but then it does handle A3 documents. Kyocera isn't joking when it recommends an installation team of four.

A USB interface is provided, but we'd expect almost all purchasers to use the Gigabit Ethernet interface. Options include a second Gigabit Ethernet card, a document finisher (sorting and stapling), single or double cassette auxiliary paper feeder, and a card reader for user authentication.

Documentation is very fragmented, and we found the short file names, such as 'FMU_E.pdf', didn't give sufficient clues about the content, so locating material was a challenge.

The first page of our business document printed in 15 seconds, with the second page emerging two seconds later as you'd expect from a 25ppm device. Duplex output increased the time to 26 seconds.

The C8525 produces particularly smooth and even images, though the toner does have a slightly waxy feel. Text, graphic and photographic elements were all of above average quality, with smooth tones, very good colour fidelity, and shadow detail matched by few laser printers we have tested.



Copying gave some of the best results we've seen, while scans can be directed to SMB shares (tested) or FTP servers, or emailed. A WIA driver is also provided, which we used successfully with Windows Fax and Scan. Unlike some models, the C8525 handles A3 for scanning as well as printing.

Direct printing from and scanning to USB storage is supported, and Kyocera's Mobile Print for Android (tested) and iOS allows a network-connected C8525 to print from and scan to mobile devices.

Like many modern MFDs, the C8525 is able to run its own applications (if an optional compact flash card is installed) such as Cloud Connect, which allows scanning to and printing from Evernote. Installation involved a surprising number of steps, and even though it's a free app, a licence key is required after 90 days.

Stephen Withers

9
10

Creative SB Tactic3D Rage

What's in a name?

HEADSET

au.creative.com

\$100

Good sound quality,
easy to connect,
relatively inexpensive.

Weak mid-range.

Peripheral names baffle us sometimes. We're scratching our heads over what specific 'rage' Creative's latest Sound Blaster headset is supposed to inspire. Its claims of 3D audio are a bit of a joke, sure, but then we've never come across a surround sound headset that lives up to its hype. This '360 degree' model is no different – playing 3D titles like *Left 4 Dead* with these cans on, we couldn't tell on sound alone what direction zombies were coming from. But that hardly drove us to hysterics, maybe because it's par for the course for headphones, and maybe because, 3D audio aside, this is a pretty solid gaming headset.

Light and comfortable, the Sound Blaster Tactic3D Rage offers great sound quality by wireless standards, thanks largely to a bundled 2.4GHz transmitter that bypassed the usual Bluetooth compression foibles of this style of headset. In fact, audio quality on the whole is quite good. Clarity is excellent all round, and though there's a noticeable lack of mid-range kick, the 50mm neodymium drivers push out some strong bass and, surprisingly, good trebles too. For most games, that's a neat balance, offering both meaty explosions and clear dialogue.

Meanwhile the detachable mic boasts clear, well isolated recording, and the added novelty of a variety of software-based filters. Embarrassed by the sound of your own voice? The



Tactic3D's filters can deepen and smooth out your vox as well as overlaying alien/elf/orc effects. It's a gag feature, but we'll admit it: we're impressed with its quality.

Connectivity is great, too – being USB only, there's no complicated cabling. Unlike some other surround headphones, you just plug in the bundled transmitter and you're good to go in minutes (even less if you connect via the USB charge cable).

Speaking of charge cables, we were fairly impressed with how long this headset held a charge, too, with a few days of on-and-off use being our experience. So again, we're not sure what Creative's getting at with the 'rage' here. We've been left pretty chilled out by our time with these cans.

Dominik Krupinski

7/10 HTC Windows Phone 8S

The affordable WP8 option.

SMARTPHONE

www.htc.com/au @
From \$33/month \$
(24-month Optus contract)
Inexpensive, microSD ✓
card support.
No front-facing camera, ✗
low-resolution display.

The 8S is the little brother of the highly impressive Windows Phone 8X and an obvious play towards the middle ground of phone users. Windows Phone as an operating environment has always been very good at eking out every last drop of processor performance, so we were curious to see how the 8S's dual-core 1GHz processor and 512MB of RAM would compare with the more high-end devices.

The answer is that while it's clear that the smaller 4in 480 x 800 233ppi display isn't as crisp as on the flagship devices, you'll struggle to really push the 8S to its limits in a way that makes it seem like a huge step down from its more costly brethren. One big plus in its favour is that while there's only 4GB of onboard memory, it's microSD capable, so you can boost its storage yourself – something the 8X can't do.

The 8S drops other features you'll find in the 8X and other high-end Windows Phone devices. There's no front-facing camera, which means Skype calls are a touch one-sided. The single rear camera is an unimpressive 5MP shooter that offers, rather predictably, only bland photo results – certainly nothing on par with the excellent Nokia Lumia 920. Its plastic construction gives it a cheap feel in the hand, although the two-tone colour scheme is nicely striking. It's a 3G-only model, but that aids in keeping battery life good, which is important given that HTC has only equipped it with a 1,700mAh non-removable battery. On average, the 8S sailed through a single



day's moderate usage with plenty of power left.

The 8S is an Optus exclusive at a low, entry-level price point. It's not the most stellar handset, but the price reflects that. If the simple tile strategy of Windows Phone appeals to you, it's an easy and cheap way to get into that ecosystem.

Alex Kidman

8/10 Roccat Lua

An elegant weapon for a civilised age.

MOUSE

www.roccat.org @
\$30 \$
Cheap, 2,000dpi, ✓
optical sensor, 1,000Hz polling rate.
No customisable ✗
buttons.

Roccat's simple Lua is quite pleasing to use with its ambidextrous grip. And when I say simple, I mean it. This is a classic three-button optical mouse, very much in the Microsoft IntelliMouse mould. If you're after a seriously customisable unit with more buttons than you have hair follicles, look elsewhere.

As its budget price tag suggests, it's very much at the low end of the gaming peripheral market. But that doesn't necessarily make it a weak offering. Roccat is a seasoned gaming peripheral manufacturer and the Lua shows its pedigree. It's nicely designed and the compact layout will make it a hit for claw-grip gamers as well as left-handers. Personally I'm more of a palm-grip kinda guy, so I'd rather have a little more real estate under my hand.

My other concern here is the weight. I happily used an old optical IntelliMouse for many years without a worry, but as soon as I picked up a proper, weighty gaming mouse, I couldn't go back. I find a weighted mouse responds far more smoothly than lighter offerings, and there were times in games where the Lua felt a little twitchy.

This could also be because I'm comparing it to my general gaming experience with laser mice. While the maximum 2,000dpi setting might not sound like much, I never felt like



the lower setting was holding me back, despite usually running my mice at around 5,600dpi.

As for the lack of extra buttons, my feelings are mixed. I use the back/forward buttons a lot in general PC use, but I rarely go further than the two main buttons and the mouse wheel in-game, even if I've configured melee attacks to another switch. Mid-frag, I didn't miss the extra buttons much at all.

Roccat has created a well-priced rodent with decent gaming heritage and strong performance. If dropping \$100 or more on a mouse makes you gag, this affordable mouse should tempt, especially if you're a leftie.

Dave James

OCZ

VECTOR YOUR WAY INTO

FARCRY 3

For a limited time, purchase the groundbreaking
OCZ Vector Solid State Drive Series (256GB or 512GB)
and receive a **free** downloadable Far Cry® 3 PC Game.

BUY NOW

VECTOR



Superior sustained performance
over the long term for maximum
endurance



Industry's highest
performance
with up to 100,000 IOPS



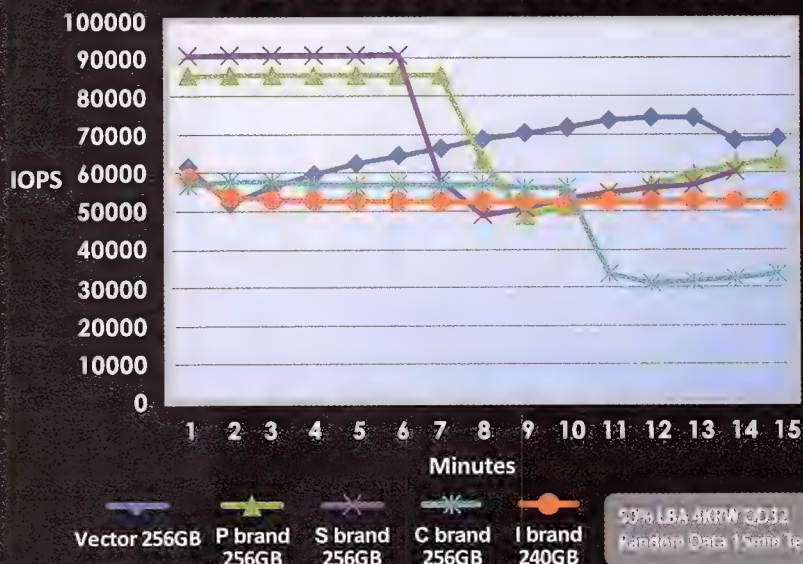
Unmatched endurance without
compression or loss of usable capacity

Performance	128GB	256GB	512GB
Sequential Read (MB/s)	550	550	550
Sequential Write (MB/s)	400	530	530
4KB Random Read (IOPS)	90,000	100,000	100,000
4KB Random Write (IOPS)	95,000	95,000	95,000

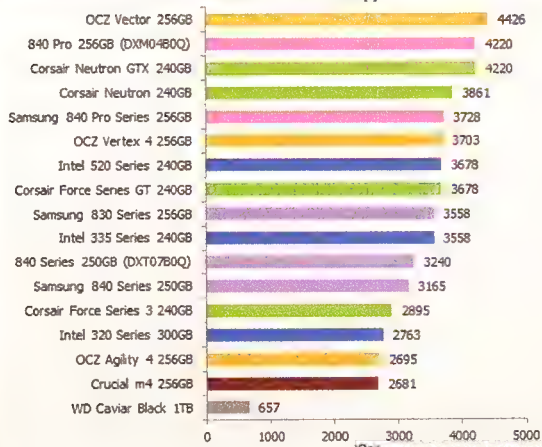
■ Rated to deliver 20GB host writes per day for 5 years



Performance Over Time



TR DriveBench 1.0 - File copy



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9/10 Parallels Desktop 8 for Mac

A solid solution for running Windows applications on your Mac.

SOFTWARE

www.parallels.com @
\$89.95, switch to
Mac Edition (includes
USB cable) \$99.95
Closer integration
with Mac OS, better
performance, iOS app.
Still not as fast
as Boot Camp. x

'Run Windows on your Mac' – that's what Parallels Desktop 8 for Mac promises on the box, and that is indeed what it delivers. That's what it has delivered since version 1, but it's a bit of an understatement with version 8. Really, you can do much more.

For instance, Parallels Desktop 8 is even more closely enmeshed with Mac OS X, particularly with Mountain Lion. If you're trying to view a web site in Safari on your Mac and find it's one of the many still optimised only for Internet Explorer, you no longer have to copy the URL, open Parallels, start IE and paste the URL. Simply click on the Internet Explorer icon that Parallels has added to Safari and the rest is automatic. (This only works with Safari, however, not with other Mac browsers.)

And just as you've always been able to share peripherals attached via USB (such as keyboards and printers) between Mac and Windows environments, now you can share peripherals attached via Bluetooth without having to go through a separate setup procedure for each OS. This cuts out a massive criticism of older versions of Parallels for me, since most of the peripherals I use are wireless these days.

For Mountain Lion users, you can add Windows applications to Launchpad, or have them sitting in the Dock. You can even drag and drop files to Windows app icons in the Dock to open them, just as if they were Mac apps. You can use Mountain Lion features such as system-wide dictation, trackpad gestures and the Notification Center in your Windows apps. It makes Windows – particularly Windows 8 – much better.

Of course, you can run more than just Windows. You can run Linux or even older Server versions of Mac OS X as well.

Unfortunately, Apple hasn't yet allowed virtualisation of its client operating systems, but if you can pick up an old copy of Snow Leopard Server, you can have your modern Mountain Lion features and keep running older PowerPC apps that require the Rosetta translation software no longer included in OS X. (I actually do this because I have some old FileMaker databases that I haven't yet rebuilt.)

Another handy feature little lauded is the Parallels app for iOS (\$5.49), which allows you to use your virtual machines remotely with your iPhone or iPad. Yes, you can also do this with other remote control software, but with the Parallels app you're not controlling the Mac as well, just the virtual machine. It makes for a tighter interface and performance.

This leads me to my main criticism of Parallels 8, though it's a minor one. For all its improvements in performance areas – even 3D games run tolerably – it's still not as fast as running Windows 'natively' using Apple's Boot Camp software. Boot Camp requires a reboot of your Mac, but transforms it into a genuine Windows PC, running everything as fast as the hardware can manage.

I'm also a little disappointed with the 'migration' tools provided by Parallels, in that they'll allow you to move your files (including photos, music and so on) from an old PC over to your new Mac, but they keep them in the Windows virtual machine. A better migration tool would place these things into the proper place on the Mac, rather than keeping you tied to old apps. It's a semantic argument, really.

Overall, whether you're a Windows user looking to switch, or a Mac user who needs access to other OSs for any reason, Parallels Desktop 8 is a solid solution.

Matthew J. C. Powell



8/10 CyberLink PowerDirector 11 Ultimate Suite

Lights, camera, automation!

SOFTWARE

www.cyberlink.com @

\$199.99 (download version) \$

One-button fixes for novice users, bundled audio and colour grading apps, includes pro-level tools. ✓

No effect/transition search, audio scrubbing noticeably absent. ✗

Given the steep learning curve of video production apps like Adobe's Premiere Pro and After Effects, those looking to dip their toes into the world of video may well be better served by choosing more novice-friendly apps like CyberLink's PowerDirector. Coming in at an affordable \$200 and offering a variety of labour-saving wizards – as well as a comprehensive set of serious editing tools – this editing, colour grading and audio package serves as a very decent entry or intermediate jack-of-all trades for video work.

This latest version of the PowerDirector suite boasts support for 4K resolution footage, 3D video and industry-best rendering speeds, thanks to native 64-bit code and GPU acceleration. But for first-time users, we think CyberLink's efforts towards ease of use will appeal more than most of those specs.

The software does a good job of making a wide array of tools available to users without being overwhelming, as well as offering a variety of wizard options with varying degrees of automation. Easy mode and various 'magic' styles can take control by scanning footage for points of interest (such as pans, zooms and human faces) before cutting out the other junk and automatically setting the whole shebang to music. As you might expect, the results are somewhat hit and miss, but if all you want to do is drag and drop your holiday footage and punch out a DVD, it does the job.

Some of the less overbearing helpers are actually quite useful. Beat detection, for instance, can analyse a user's choice of background music and mark the track's beats on a project's timeline – a godsend for editors learning to cut to music. So too is the large (yet admittedly, largely naff) bundled music library.

For those more interested in doing things themselves, PowerDirector 11 is one of the more capable consumer video packages. With support for up to 100 tracks and

decent trimming and ripple edit tools, cutting footage into shape is quite easy (if not quite as controlled as via more feature-packed apps like Adobe Premiere Pro). Polishing the resulting clips is a snap with capable one-touch lighting and stabilisation fixes.

Post-production is also well served for software of this price, with a combination of preset overlays like titles, graphics and particle effects all easily dragged and dropped over footage. The inclusion of keyframes means seasoned editors can finetune footage, too.

The inclusion of CyberLink's ColorDirector and AudioDirector programs also affords some degree of detail work when it comes to colour grading and faffing with audio. Nice.

That said, while PowerDirector 11 is generally very strong, it doesn't completely escape the pitfalls of lower-priced software. It's nice that the package comes with over a hundred fancy transitions and effects ('wormhole wipe', anyone?), but without a search function, making quick, competent transitions like simple fades and cross-dissolves can mean trawling through long menus of instantly dated effects. The ability to set favourite folders does alleviate this somewhat, though.

Meanwhile, as much as the beat detection system is a nice handhold for less experienced users cutting to a rhythm, the lack of audio playback while scrubbing video (quickly scanning over footage for the good bits), makes it difficult to manually pick up audio cues, which means you can pretty much forget making slicker music videos with this software.

If you can deal with those setbacks or you're new to video and would appreciate a helping hand, PowerDirector Ultimate ought to serve you very well indeed.

Dominik Krupinski

DREAM SCREENS

Think there's nothing new in PC displays? Think again. Bennett Ring rounds up six of the best.



Until scientists figure out how to wire computers directly into our brain stem, using a monitor will remain the best way to interface with the PC. Like any piece of tech, today's monitors continue to grow and evolve, if perhaps not quite at the same blistering pace as CPUs or hard drives. The good news is that it's now more affordable to buy a display that's bigger, faster or weirder than ever before, at prices and quality that would make 2005's displays blush. The bad news is you'll probably need a supercomputer to make the most of these new displays.

LCD TVs have exploded in popularity over the last few years and their mass production has given PC manufacturers the facilities and stock to build large displays at costs only dreamed of a couple of years ago. They're still premium products with premium price tags, but these 27 and 30in displays aren't quite as ridiculously priced as they once were, starting at around the \$600 mark. That's almost half of the \$1,000 plus demanded just a few years ago. Most have a native resolution of 2,560 x 1,440, offering a vast desktop perfect for using 2D applications. This huge number of pixels is a double-edged sword for gamers; while *Battlefield 3* looks incredibly sharp at this size, it requires a monster of a PC to get smooth frame rates. We're talking twin high-end GPUs for 60fps gameplay, limiting gaming at this size to the elite. If you're not going to be gaming, then jump right in – the extra space is also a godsend for multitasking.

Today's monitors are also getting faster. We've been stuck with a refresh rate of 60Hz for years, but the new breed of display is doubling this to 120Hz. These extra frames deliver two benefits: 3D capability via stereoscopic technology, as well as super-smooth 2D performance. Unfortunately, fast *and* big isn't feasible at the moment, with 120Hz generally limited to 24in or lower, at a resolution of 1,920 x 1,080. There are a handful of 27in displays that can do 120Hz, but they're limited to a lowly 1080p resolution. While gaming at 120Hz is incredibly smooth, you're going to need serious GPU horsepower to hit 120fps to make the most of it, ditto with gaming in stereoscopic 3D. 120Hz is also rather pricey considering the screen size, with 24in models around twice the price of similar 60Hz displays.

When it comes to weird monitors, nothing beats the new range of ultra-wide displays. Using a new display ratio of 21:9, these bezel-busters are a viable replacement for multi-monitor configurations, selling at a fraction of the cost, but offering many of the same benefits. Whether or not your desk is wide enough for one of these super-stretched monitors is another matter entirely. With a 2,560 x 1,080 resolution, they also require a decent GPU or two for gaming. Noticing a theme yet?

We've taken a look at a selection of desktop monitors here, which fit into each of these three premium categories.

MISSING IN ACTION

We put the call out to all major monitor manufacturers for this roundup, but not all of them were able to provide displays. Samsung and ViewSonic were notable for the multiple requests for samples that we sent, all of which were met with negative responses.



Acer HR274H

Not your ordinary 3D display.

@ www.acer.com.au

✓ Nice price, solid image quality in most areas, comfortable 3D.

✗ Half vertical resolution in 3D, low 2D resolution, poor stand and menu.

Acer's attempt at a big-screen (27in) 3D display is definitely unique; the question is whether it's any good. Unlike most 3D screens that use stereoscopic technology to deliver screen-busting depth, the Acer uses passive 3D – a technique that's still rare in TVs. The benefit is a more comfortable viewing experience in 3D, with the polarised glasses making headaches far less likely than the active method of stereoscopy that troubles some viewers. However, the cost is one of image quality, with a much lower projected resolution. Passive technology halves the number of vertical lines each eye sees, so you'll see large horizontal line gaps (much like venetian blinds) if you're sitting at the average monitor distance. Personally, we much prefer stereoscopic displays at average computer using distances, but we also don't suffer from any headaches.

This lower image quality is also rather apparent when running in 2D mode. Unlike more expensive 27in displays, the Acer uses a lower resolution of 1,920 x 1,080, which at this size makes the pixel structure rather obvious. True, it helps to keep the wallet impact low, but at a big cost to image quality.

It's a shame, as the monitor's TN panel performed quite well in the **Lagom.nl** image quality tests. It had a few issues with gradient banding and poor white saturation, but excelled in every other test. Unfortunately, the physical trimmings of the product are also rather limited, with a very basic stand and minimal onscreen display (OSD) options.

It might be half the price of competing 27in displays, but it's also a long way behind when it comes to image quality. You pay for what you get, and here, that's a display with very noticeable image compromises, exacerbated by the close distance most users sit in front of their screens. If you're going to be using it from much longer distances, that's a different story: the lower resolution will be far less noticeable. Note that the Acer web site claims this is a touch-enabled monitor, but it's not.

i 5MS RESPONSE TIME
EXTERNAL POWER PACK
60HZ REFRESH RATE



AOC D2757Ph

27in for the price of 24in.

@ www.aocmonitorap.com/anz

✓ Comparatively affordable, slightly less visible pixel structure, comfortable passive 3D.

✗ Low resolution in both 3D and 2D, horrible stand.

Acer might be one of first the companies to use passive 3D technology on its PC displays, but it's not the only one. AOC has used the same technique here, which accounts for the incredibly low price tag.

We've got to hand it to AOC's bezel design team, as the borderless design used here is stunning. If only they'd have worked as hard on the stand, which has a grand total of zero ways to adjust it. If you don't like the default height or angle, too bad, as you're stuck with the deigned viewing position. The OSD is accessed by touch buttons on the bottom-right of the frame, revealing a deep range of options. Our only concern was the power button, which took a few attempts to engage.

Once again, we see a 1,920 x 1,080 resolution, which is literally a stretch for a 27in screen, making pixels rather obvious to see. It's better than the similarly spec'd Acer HR274H, though, with slightly less space between pixels. However, it still has the obvious vertical lines stretching across the entire display, which are magnified in 3D mode as the display splits the vertical resolution in two. How obvious these flaws are will depend entirely on how you use this display. If you're sitting at a usual PC range of less than a metre, it's impossible to ignore the lower resolution. On the other hand, if you're going to mount it on a wall on the other side of your room as a TV replacement, the flaws are much harder to spot, making this a tempting TV alternative.

AOC has used an IPS panel in this display, which should deliver better colour quality and off-axis viewing, at the cost of the response time and contrast. Our **Lagom.nl** benchmarks back up those claims, with perfect response time testing marred by very obvious banding. Uniformity was noticeably strong, with very little light bleed across the panel.

Whether this is the display for you will depend on how you use it. We have to assume that it'll be within regular PC use ranges and at this range, the image quality sacrifices are too great to ignore.

- i 5MS RESPONSE TIME
- 60HZ REFRESH RATE
- LED BACKLIGHT



ASUS PB278Q

A big screen for the masses.

- @ www.asus.com.au
- ✓ Excellent image quality, versatile stand, competitive pricing.
- ✗ Plain bezel and stand design, slightly slower response time.

The ASUS PB278Q is the perfect example of the continued decline of large display prices. Just a couple of years ago, a 27in display of this quality would easily have set you back in excess of a grand; nowadays it's almost half the price. It's still not exactly cheap by the standards of 24in displays, but it's a premium monitor that's no longer out of reach for most computer users. You're getting a hell of a lot more pixels for your money, with a native resolution of 2,560 x 1,440. However, how many corners has ASUS had to trim to hit such an affordable price tag?

Thankfully, not too many. The bezel and stand are both workmanlike in their visual design, with a plain black look that's neither sexy nor ugly – it just is. The OSD controls use old school buttons that require (gasp!) actual pressure to activate, which could be exhausting for those accustomed to touch controls, but we found them easy enough to use. The stand allows a nice range of movement in the vertical, viewing angle and rotational ranges, making it easy to get the positioning just right for your unique computing space.

The most impressive part of the package is the PLS panel used within. Frankly speaking, the image quality is outstanding for a display of this size and price. It performed incredibly well in all of our **Lagom.nl** tests, with the exception of a slightly slower response time than faster panels. A huge range of configuration options allows deep calibration, while the included sRGB mode is a godsend for professional image manipulators. Even at the closest of viewing distances, pixel structure was impossible to spot without the help of a magnifying glass, and we found the higher levels of brightness almost too bright.

Overall, ASUS has delivered an excellent entry point for the 27in segment of monitors. It's still a lot more expensive than a 24in alternative, but this is fantastic value for money if you're looking for a bigger display.

8
10
\$499



- i 120HZ REFRESH RATE
- 2MS RESPONSE TIME
- SMART SCALING



BenQ XL2420T

Built by gamers, for gamers.

- @ www.benq.com.au
- ✓ Super-smooth gaming, excellent 3D performance.
- ✗ Very expensive for 24in, a couple of basic image concerns.

At twice the price of other 24in screens, the BenQ XL2420T initially seems incredibly overpriced. However, once you've experienced the silky-smooth motion that the 120Hz display is capable of, it'll be hard to go back to a sluggish 60Hz monitor.

This boost in refresh rate is designed with a very specific target audience in mind: gamers. They'll make the most of it in two ways, the most obvious of which is 3D gaming. Supporting Nvidia's second iteration of its 3D technology, 3D Vision 2, it's arguably the best 3D you'll find when it comes to gaming, with a much brighter image than the 3D of the past. There's also minimal crosstalk – an issue often associated with the stereoscopic 3D technique used here. The 120Hz frame rate is also fantastic for 2D gamers, making games appear much smoother and more solid than ever, as well as lowering input latency, thanks to the lower frame render time. There's one issue with both uses, though: you're going to need a mega PC to get games to run at the frame rates required by both modes, with dual GPUs an absolute minimum.

The list of gamer features goes on, with a special contrast mode that brings out detail in dark areas, without over-brightening the rest of the image. There's also a special control box for flicking between image profiles, including modes built by professional FPS players. Incredibly low 2ms response times give gamers the edge in high-speed conflicts, provided they've got the reflexes to make the most of it, and also crush any ghosting problems. Our only concern is the base image quality, with the **Lagom.nl** tests indicating rather average performance when it came to black levels – exactly the opposite of what the monitor claims.

For most, the high price tag is hard to justify, even if operating Windows at 120Hz does feel wonderfully smooth. But for serious gamers, the price will be well worth it for the leap in gaming performance, provided you bear in mind the commanding hardware needed to power it.



i 2,560 X 1,080 RESOLUTION
60HZ REFRESH RATE
8MS RESPONSE RATE

Dell U2913WM

Welcome to the real widescreen.

@ www.dell.com.au

✓ Wide yet cheap, fantastic image quality, an important aspect ratio for the future.

✗ Will have to move your head, slower response time.

While 21:9 might be a rather unusual aspect ratio for computing, it's actually a very close match for the screen dimensions used in movie theatres. Today's 16:9 and 16:10 displays are forced to use big black bars to get around this, although the Dell U2913WM has no such issues. Running the latest Hollywood 2.35:1 blockbusters on this 21:9 ultra-wide display resulted in the near total removal of black bars, which is a touch that you won't appreciate until you see it in action. There was still a sliver of black at the top and bottom, but it was so small as to be imperceptible.

So this monitor is great for movies, but what about regular desktop duties like surfing the net, using Word or sending emails? Running these kinds of programs in full-screen mode stretches them out too far across the 29in width, but if you instead run a couple of windows side by side, you get all the benefits of multi-monitor configurations, without multiple bezels breaking up the image. Gamers in particular will love the stretched look, as it affords them a wider field of view that will drag them deeper into their games.

Our image quality tests showed excellent performance across the board, like most of the displays here, though the response time wasn't up there with the fastest. Ghosting wasn't an issue in most games, but twitch gamers may notice it more. Compared to LG's ultra-wide display, we felt the Dell definitely had the edge, as it lacked the font blurring found on the LG. The 2,560 x 1,080 resolution here is good, although the 60Hz refresh rate is nothing to write home about and the 8ms response time is a little sluggish.

Offering most of the benefits of a 30in display at just \$600, the Dell U2913WM ushers in a new breed of ultra-wide monitors. We really can't see any downsides to the form factor, unless you happen to live in an inner-city shoebox.

i 2,560 X 1,080 21:9 DISPLAY
IPS PANEL
5MS RESPONSE TIME
60HZ REFRESH RATE

8/10
\$699



LG 29EA93

How does it stack up to Dell's offering?

@ www.lg.com/au

✓ Wide 29in display, solid image quality, wide range of I/O ports.

✗ Very soft display, terrible stand, more expensive than Dell's offering.

We've read that this ultra-wide 29in display uses the same panel as Dell's U2913WM, which would lead many to expect similar performance levels. However, behind the panel of a display are a range of components and software tweaks driving it, and it's obvious that LG differs from Dell in this regard.

The most obvious difference between the two monitors is sharpness. To put it bluntly, the LG 29EA93 has a much softer look, which can make fonts look a little fuzzy. Some might not mind this warmer, softer feel, but we're accustomed to tack-sharp pixel precision, so we found this haziness a little uncomfortable. It was as if we needed to squint to make the image appear clearer.

The stand is also different to Dell's and the LG's is a shocker. The circular chromed stand might look attractive, but it's absolutely useless for tuning the position, as it offers zero configurability. When are stand designers going to realise that all the good looks in the world are useless if the stand doesn't move, as users need to configure the display to fit a wide range of workspaces?

There's a good variety of I/O ports, including DVI-D, two HDMI, DisplayPort along with MHL (Mobile High-definition Link). Like the Dell, this one also has a 2,560 x 1,080 resolution with a 21:9 aspect ratio.

Thankfully, the OSD is a decent offering, being both easy to use and comprehensive in its range of options. Image quality was good overall, but struggled in the **Lagom.nl** contrast tests, with brighter colours all merging into one. Response times were also a little lacklustre, but no worse than Dell's.

When you consider that the 29EA93 is \$100 more expensive than the Dell U2913WM ultra-wide display, LG really needs to fix the softness of this monitor to compete. A monitor stand that also worked well couldn't hurt either. **ATC**

THE FUTURE OF PRINTING

Stephen Withers tries to find out when the majors will make 3D printers.

Printing in 3D is currently at a similar stage to computing in the mid-1970s. The technology is in reasonably wide use by companies that can justify the purchase or lease of expensive equipment, and there's a growing number of people getting excited about the potential for making prototypes, one-offs and short runs at home, work or educational establishments. The problem for that group is that the most affordable 3D printers can involve at least some assembly and require a degree of mechanical skill to get the best results.

You might argue that people interested in 3D printing are likely to have those practical skills, but that's questionable and probably relates to the specific application. It might be the case for someone who wants to fabricate a replacement knob for an old machine or vehicle, but perhaps not for the person who wants a one-off lampshade or wargaming figure.

So where is the Commodore PET, Apple II or Tandy TRS-80 of 3D printers? They were the products that took affordable computers out of do-it-yourself territory and into millions of homes and small businesses. Although Apple turned out to be one of the most successful tech startups, Commodore and Radio Shack (Tandy) were already established

businesses, respectively producing calculators and a wide range of electronic products.

We approached the major printer vendors, but most were unwilling or unable to shed any light on their plans in the 3D area. We got a polite 'no comment' from Canon, Epson, Fuji Xerox and OKI, and no response (though it's only fair to note that we couldn't wait very long for a reply) from Brother, HP, Lexmark and Samsung.

Whether this is because the companies are actively working on 3D printers and aren't yet ready to discuss their plans, they're not developing products and don't want to admit it, or they just couldn't find an appropriate spokesperson in time is an open question, and we wouldn't advise reading too much into their responses or lack thereof. Frankly, we'd be amazed if none of these companies had 3D printers or at least 3D printing technology under development. After all, HP dipped a toe in the water back in 2010 with the Designjet 3D – the fruit of a partnership with 3D printer specialist Stratasys.

We did hear from Mark Vella, sales and marketing director at Kyocera Document Solutions. "The possible advancements of 3D printing could generate not only cost-saving opportunities to companies, but control over what was previously a specialist technology, enabling them to bring this technology in-house rather than going to third-party providers to develop the finished product," he said. "There are parallels between this and the previous advancements made of colour reproduction when this facility was brought in-house."

That's a good point. Successive waves of printing technology since the arrival of desktop publishing in the mid-1980s changed the rules about what could or couldn't be done economically in-house. It's not just the nature of the output, but the quantity required and how quickly the finished product is needed. Another issue is that some service providers may be locked into a cost structure due to their investment in technology that was superseded by something faster, cheaper and better – and sometimes all three – before the old equipment had been amortised.

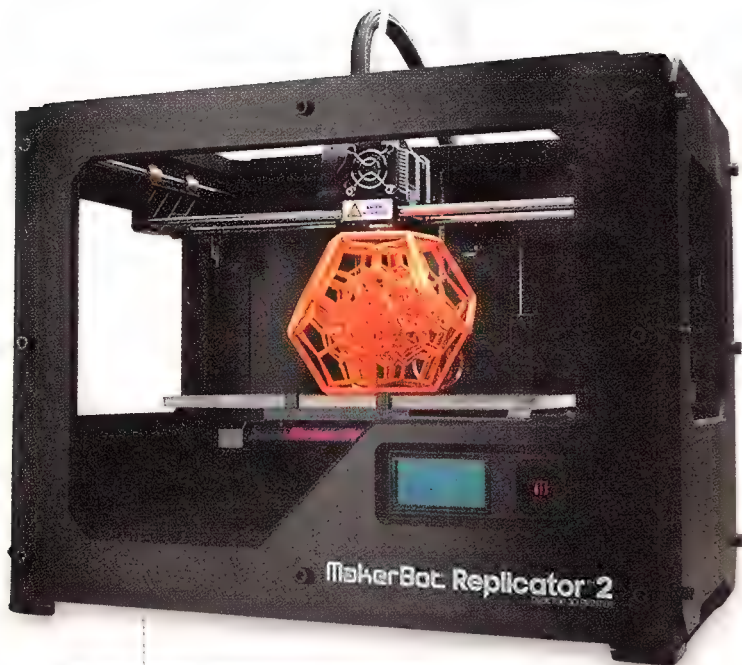
3D PRINTING TECHNOLOGY

You can argue about just how appropriate the term '3D printing' is, but it seems to be here to stay. While some early and important work was done using a modified inkjet printer mechanism to selectively bind powder together (a technology still used in some high-end devices such as the 3D Systems ZPrinter range, which includes models capable of producing pieces in full colour), most 3D printers that are currently affordable for home use work by melting a plastic filament and depositing tiny drops to build up the workpiece.

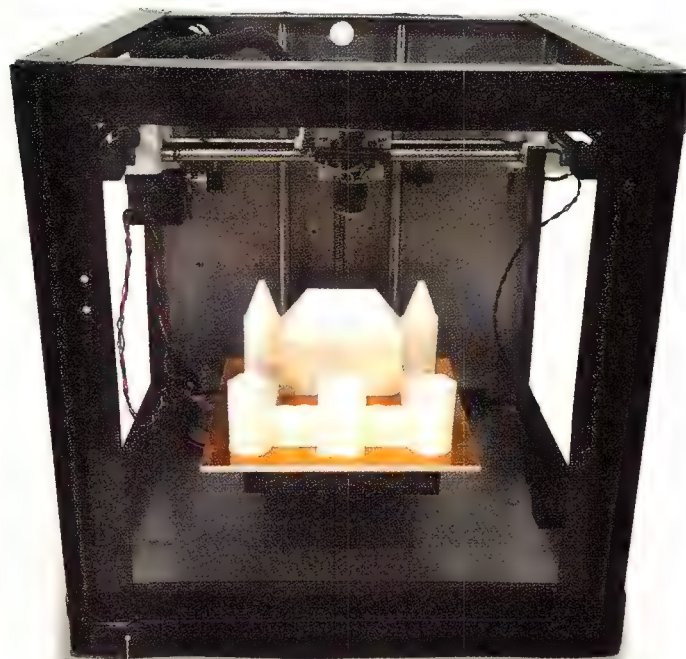
Variations on the binding approach include sintering (bonding using heat, but without actually melting) metal or polymer particles, and melting metal particles. Other technologies use light to harden liquid or gel polymers or resins. 3D Systems has a patented variation on that theme: resin is deposited onto a film and transferred to the workpiece, where the entire layer is hardened with a flash of ultraviolet light.



HP's Designjet 3D Color Printer.



Prices for MakerBot's Replicator 2 start from just over \$2,000.



You can print just about anything you can think of!

Something similar could be ahead with 3D printing. Improvements in technology or manufacturing methods, possibly driven by the number of devices being purchased, could substantially change the economics of 3D printing. For example, laser printers once cost \$10,000 or so and were rarities, but nearly 30 years later, basic models sell for less than \$100 and are found in offices and homes around the country. Whether a lower-end unit is adequate or if the job will have to be sent to an outside service will depend on the nature of the object to be made.

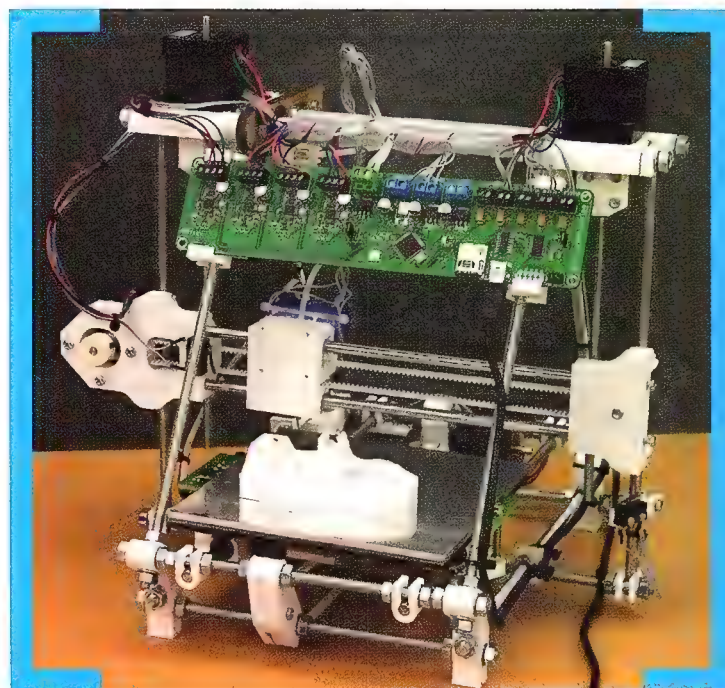
- **Size.** Lots of people have inkjet printers capable of producing prints 10 x 15cm to A4 size, but for A3 or larger they go to a service bureau. With 3D printing, the cut-off may be around 20 or 25cm on the longest dimension.

- **Material.** ABS and some other plastics can be deposited fairly accurately by reasonably low-cost hardware. Other materials, especially metals, require significantly more expensive technology. So you may be able to make that wargame figure or lampshade at home, but metal parts for that vintage car rusting in the garage will probably be turned out at a service bureau, or depending on the nature of the part, you may

fabricate a plastic master that's then used to create a mould to cast the part. (And we have to ask, will we see car enthusiasts swapping 3D files to allow parts to be made without having to scan or draught the designs each time?)

- **Colour.** Just as a colour laser printer is bigger, heavier, more complex and more expensive than an equivalent mono device, a 3D printer capable of producing multicoloured parts is a more complex beast. Different-coloured plastics can be deposited fairly easily, but if you need to match arbitrary colours, then more complex technology is needed.

So before the decade is over it might be commonplace to manufacture certain types of one-off or short-run items at home or within a non-manufacturing business. However, just as affordable laser multifunction devices failed to displace the copy shop (which now tends to focus on larger runs, stapling and other finishing, larger formats, heavier stock and value-added services such as design), there'll still be a place for companies that offer more advanced prototyping capabilities, and the demise of mass production is barely on the horizon. **apc**



BUYING 3D PRINTERS

One of the more interesting projects is RepRap (www.reprap.org), which has the goal of developing a 3D printer that can replicate itself. It's currently limited to producing the plastic parts needed, but thought is being given to how it could be extended to produce conductive and metal parts.

Complete kits to build RepRap 3D printers are available from RepRapPro (reprappro.com), a UK company that has RepRap inventor Adrian Bowyer as one of its directors. Prices start at US\$688, which includes shipping.

Being open source, the RepRap project has spawned a number of related designs, including the prebuilt Solidoodle (www.solidoodle.com) range, which uses RepRap electronics. Solidoodle has no distributors, but does ship worldwide. Prices start at US\$499 excluding shipping.

MakerBot (www.makerbot.com) is another manufacturer of prebuilt 3D printers. It too has links to the RepRap project, but recently began moving away from its open-source roots with the introduction of its Replicator 2 model. MakerBot products are distributed in Australia by Inition Thinglab (thinglab.com.au), with prices starting at \$2,068. Inition Thinglab also sells other brands of 3D printer, including some less expensive models.

LIGHTS, CAMERA, EDIT!

How much of an old video editing PC should you keep and how much should you toss? [Darren Yates](#) looks at the upgrade process.

The two most performance-hungry applications you can run on a PC are gaming and video editing. They work a system's components differently, but the demand is there all the same. This month's PC build request came in from Glyndwr Bartlett, who's looking to upgrade his old video editing system. He's also kindly supplied a list of specs for his current system.

- **CPU:** Intel Core 2 Duo E8400 Retail Box
- **Cooling:** Thermalright IFX-14
- **Fan:** 3 x Scythe S-Flex 1,200rpm
- **Motherboard:** ASUS Striker II Formula
- **Memory:** OCZ PC2-8500 Reaper HPC 4GB (2 x 2GB)
- **HDD:** 4 x Seagate 7200.10 320GB (RAID 5), 1 x 200GB for operating system
- **Graphics:** Palit 9600 GSO Sonic 768MB
- **Power Supply:** Amacrox AX750-EP
- **Case:** Armor+ Tt Thermaltake
- **Monitors:** 2 x LG E2442V-BN

Glyn's after a new Intel Core i7-based system so his other question is one we all ultimately face when thinking about upgrading: what can I keep of the older system and what do I toss?

TWO PLANS OF ATTACK

There are always two plans of attack any time you upgrade and I reckon the age of your existing system will often determine which plan is most practical. Those two plans are to simply salvage what you can or build from scratch.

Glyn's system would've been a cracker back in 2006, but there's little to salvage here. The CPU and motherboard are obviously out and the RAM, being DDR2, is also out. The Thermalright IFX-14 is an LGA775/AM2 cooler, so it's gone. Having four 320GB drives in RAID 5 gives you 1TB of storage – that's easily doubled with just two 2TB Black-grade drives in a simple RAID 1 setup. The graphics card is a PCIe type and while it would work in a new system, there's a good reason why I wouldn't keep it (we'll talk about that in a minute).

So in the end, all you're left with is what I call the shell: the Thermaltake case, the two LG 24in monitors, the 750W PSU and the three Scythe cooling fans. At this point, I ask the question: is it worth gutting a working PC for the sake of the shell or should I start from scratch and have two working PCs at the end? That's for Glyn to decide. There's no doubt the shell (including fans and PSU) would form a good basis for a new system, but personally, I'd be tempted to keep it as a second PC and build from scratch.

THE NEW BUILD

Glyn pointed out in his email: 'I don't want gold plating, however I do want quality'. The key features he wants are cost effectiveness and good responsiveness, so here's how we'd do it.

PROCESSOR Intel Core i7-3770K

There are three ways you can go with the CPU: straight to the top drawer and use a Core i7-3770K, the second drawer and go for a Core i5-3570K, or a different chest of drawers altogether and go with AMD's new FX-8350. My take is the FX-8350 slots in between the i5-3570K and the i7-3770K for video editing – it depends what you're after. As Glyn specifically mentioned an i7 build, that's what we're going with.

MOTHERBOARD Gigabyte GA-Z77MX-D3H

I'm a fan of this Z77-chipset board, as it delivers plenty of features for its low retail price. Yes, it only has two SATA 6Gbps ports, leaving you four SATA 3Gbps ports to work with. However, we're building a video editing PC so after we include one SSD as a boot drive, standard hard disks on SATA 3Gbps ports will suffice for cost-effective bulk storage. Otherwise, the board has plenty of everything else we need: four USB 3.0 ports, 10 USB 2.0 ports and four DDR3 DIMM slots (note: they're 1.5V only).

GRAPHICS CARD Palit GeForce GTX 650 OC 1GB GDDR5

This might seem like a 3D gaming card going into a video editing PC – and it is – but it's also a graphics card with 384 CUDA cores. CUDA is Nvidia's parallel processing platform, which allows for the use of those cores on other applications, like video editing. Glyn didn't mention the apps he's using, but if Adobe Premiere CS5 or later is involved, he can use a well-known hack to enable the GTX 650 to speed up rendering times.

Even if he's not using Premiere, there are free video converters that support CUDA, including Freemake Video Converter (tinyurl.com/3alw3yc). A Palit GTX 650 with 1GB of GDDR5 RAM can be had for as little as \$120 and in terms of CUDA cores versus cost versus performance gains, it's one of the better options. So why not keep the existing card? The GTX 650 has four times the number of cores and handles the latest CUDA instruction set, and it should have no trouble running Glyn's two LG monitors.

RAM 2 x 8GB Corsair Vengeance LP DDR3-1600 (16GB)

How much RAM you need for video editing depends as much on the size of the video clips you edit as the apps you use. You can argue that 8GB of RAM is enough and as each 8GB kit costs



ASK US!

Looking to make your perfect PC, but not sure what parts to buy? Every month, our PC expert [Darren Yates](#) solves a readers' PC building quandary. Email us at contact@apctest.com for your chance to get building!

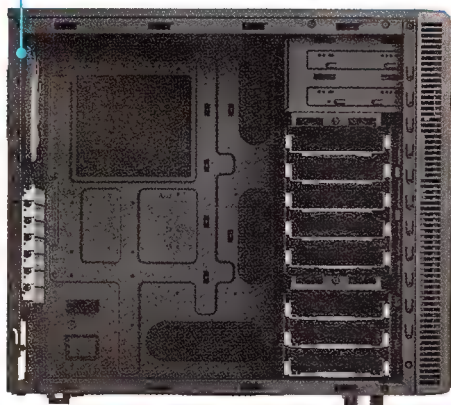
PSU

The 520W M12II PSU from Seasonic is one of the best models available.



CASE

Fractal Design's Define R4 is one of the more stylish midi-tower cases.



GRAPHICS CARD

The GeForce GTX 650 has 384 CUDA cores crying out for Adobe Premiere CS5 or later.



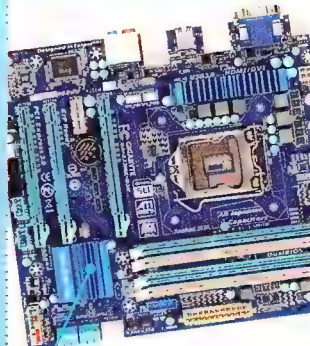
STORAGE

These drives aren't cheap, but the 2TB WD2002FAEX Black drives have a five-year warranty.



STORAGE

Corsair's new Force GS SSD features Toggle NAND flash.



MOTHERBOARD

Gigabyte's GA-Z77MX-D3H punches well above its weight.



PROCESSOR

Intel's Core i7-3770K CPU is still the best overall option for video editing.

around \$55 on the street, the choice is yours. If you're using Premiere CS5 or later, I'd lean towards 16GB (make sure you get the 1.5V kit).

STORAGE 240GB Corsair Force GS SSD, 2 x 2TB Western Digital WD2002FAEX Black HDDs, Pioneer BDR-207EBK Blu-ray/DVD burner

Having an SSD for a boot drive is a must-have these days and the new

Corsair Force GS is among the better models at around \$1 per GB. SanDisk's 240GB Extreme model is \$60 cheaper, but not as fast. Two 2TB Western Digital Black drives will give you 2TB of RAID 1 storage and you can use the SATA 3Gbps ports on that Gigabyte motherboard and still get the drive's top speed. They're not cheap, but they're well-built and have a five-year warranty, though for any hard drive setup, I'd have an off-site backup. The Pioneer Blu-ray burner gives you the option of DVD and Blu-ray disc burning and is the optional extra.

VIDEO EDITING PC

	Build #1	Cost	Build #2	Cost
CPU	Intel Core i7-3770K	\$335	Intel Core i7-3770K	\$335
Motherboard	Gigabyte GA-Z77MX-D3H (Z77)	\$110	Gigabyte GA-Z77MX-D3H (Z77)	\$110
RAM	2 x 8GB Corsair Vengeance DDR3-1600 (1.5V)	\$110	8GB Corsair Vengeance DDR3-1600 (1.5V)	\$55
Graphics cards	Palit GTX 650 1GB GDDR5	\$120	Palit GTX 650 1GB GDDR5	\$120
Storage - SSD	240GB Corsair Force GS	\$235	240GB SanDisk Extreme	\$180
Storage - HDD	2 x 2TB Western Digital WD2002FAEX Black HDDs	\$350	2 x 2TB Western Digital WD20EARX Green HDDs	\$190
Optical drive	Pioneer BDR-207EBK Blu-ray/DVD burner	\$119	None required	\$0
Monitors	None required	\$0	None required	\$0
Operating system	Microsoft Windows 8 Pro OEM 64-bit	\$149	Microsoft Windows 8 Pro OEM 64-bit	\$149
Case	Fractal Design Define R4	\$149	Thermaltake Commander MS-II	\$59
PSU	Seasonic M12II Bronze 520W	\$125	Antec NEO ECO 520C 520W	\$85
	Total Cost	\$1,802	Total Cost	\$1,283

PSU Seasonic M12II Bronze 520W

Seasonic's PSUs have a good reputation and are pretty much bulletproof. You shouldn't need more than 520W of PSU power to run this rig, so it should last forever. If you can find it, a cheaper option is Antec's NEO ECO 520C – it's \$85 and manufactured for Antec by Seasonic, so it should be a reliable unit. However, it's starting to become hard to find, so while the M12II costs about \$125, it'll be worth it in the long term.

CASE Fractal Design Define R4

The choice of case is always a personal one, but I think Fractal Design's Define R4 is a stylish, nicely built unit and it's about \$150 on the street. If that's too 'gold plated', Thermaltake's Commander MS-II costs less than \$60 online or you can go for something in between like a Corsair Carbide 300R or CM Storm Scout 2 for around \$110.

ALTERNATIVES

All up, the build price would be around the \$1,800 mark. If it's still too much, we've also created a second cheaper build that uses some of the alternatives we've suggested, knocking off about \$500. It won't perform quite as well, although it'll still get the job done. [BPC](#)

LOW POWER TO THE PEOPLE

Can we create a 10W gaming PC? Probably not, but [Neil Mohr](#) gives it a damn good go.

We're supposed to be power-conscious these days. Editor Tony has unplugged his executive vibrating chair. Deputy editor Dan had to swap his 1,000W 7.1 speaker setup for a pair of earbud headphones, while our tech monkey, Dominik, had to swap out his Intel six-core Extreme Edition for Intel's latest Atom. And they're not even socket-compatible, people – oh the humanity.

We can joke, but power consumption is a real issue. Phones and tablets can idle at sub-watt levels, but even a modest PC gaming rig can happily suck down almost 200W of power without trying. If you're sitting there browsing the web or furiously writing complaints about your neighbour's hedge to your local council, all that power seems a bit of a waste of energy.

But what are the alternatives? You could jump on your laptop, but that's often still underpowered and you're left with an awful keyboard and trackpad to use, while upgrading it always feels a compromise. But then we got thinking, perhaps we could build a full desktop system that was capable of 3D gaming and was also built around the idea of ultra-low power consumption. Maybe even low enough to rival a laptop.

At the heart of this project is going to be the new breed of Intel Ivy Bridge processors. They're built with a 22nm process and in some ways, most importantly of all, Intel's new generation of integrated HD Graphics, which means we can do away with power-hungry third-party graphics cards for our system. Sorry AMD and Nvidia.

With so much integrated to the super-efficient 22nm process, low-power states can be efficiently managed. While historically higher-power tasks now require far less juice as well, this is against a background of continued integration and ever more efficient processes – the number of ICs on a motherboard is down, the main chipset uses less power than ever, and main storage and memory can be measured in a single watt. So let's see if we can get near that magical 10W mark.

When you think of PCs and power, you're more than likely thinking 800W PSUs, 125W TDP processors and multiple graphics cards, each of which could probably suck down enough juice to power a small country town.

That view of the PC world does exist and isn't even that uncommon. All the gaming rigs in the APC office are using that type of kit. Even a modest gamer is going to use a system that's sucking its way through a couple of hundred watts under load. Never mind someone like Dominik, who's running Intel's latest six-core Extreme Edition kit.

You don't even have to go to those extremes to rack up a multi-watt power tally. Everything in a system adds up to the final power usage. From all the ICs on the motherboard to multiple DIMMs in their many slots to RAID's, every component adds to the overall power draw. While the headline components like the processor and graphics card consume the most power by far, as we'll see when we start chipping away at the power consumption, suddenly every watt of power becomes an issue.

POWER CONSUMPTION

PSU type	Idle (W)	Load (W)
Intel 275W	28	39
XFX 850W	22	36
Pico 160W	15	25
Pico+ 160W	13	23

We're not trying to demonise PC gamers and users here. On the contrary, we love the high-powered rigs and the fact is these days the components come with reasonable power savings, enabling them to power down (usually to a single watt), making them more environmentally friendly than ever.

The question we're asking is: can we have a decent desktop PC that's capable of modest 3D gaming with the latest games, but one that would have trouble powering an energy-efficient light bulb? Now that Intel has finally gotten around to producing usable integrated graphics, the answer to that question seems to be an emphatic yes. All that remains is figuring out how low we can go in power terms.

CORE EXERCISES

So we're going on a voyage of low-power discovery, taking a look at why individual components have been chosen, why they're so much better than other choices and how they've managed to achieve such a low-power result. We're going to kick things off with the processor for a couple of good reasons.

We all know that when Intel introduced its Sandy Bridge processors, it had finally introduced an integrated graphics solution that was just good enough to play the latest games. That's something you could never say about older attempts, which seemed nothing more than afterthoughts to fill out the features list. The crucial aspect of putting the graphics on-die with the CPU is that it all has to fit within the TDP of the processor package.

The processor is core to system performance, entirely so when you're relying on it to provide the performance graphics end of the system, too. Potentially, both Ivy Bridge and Sandy Bridge processors offer low-power models that could be used within a suitable system – it's just choosing the right one.

On page 49 you'll find a table comparing the various Intel HD graphics models. You'll see that the 'older' HD 3000 offers 12 execution units at a higher 650/1,250MHz clock, while the newer HD Graphics 2500 has just six at 650/1,150. You'd think this would lean us towards a Sandy Bridge-



The WD Green is a great 'big storage' option.

Viable iGPUs started with Sandy Bridge.

SHOULDERS OF GIANTS

There are places we won't go, but this guy will.

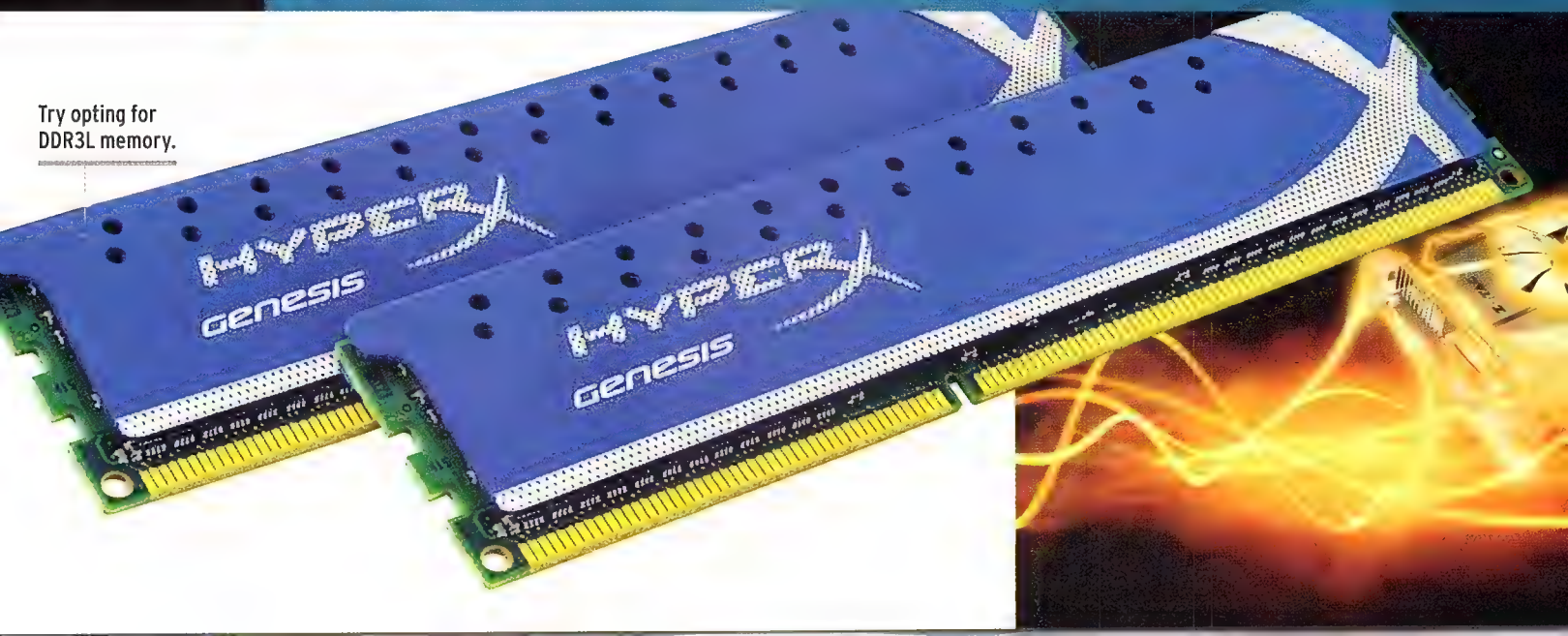
We're happy to hold our hands up and say this: Emile Nijssen deserves all the credit. Take a look at ssj3gohan.tweakblogs.net and worship at the altar of low-power computing. This is the Dutch site that inspired us to try to run the power consumption as low as possible, but this guy takes it one step beyond. The blog is in Dutch, but he's kindly written an English translation of the main article at tinyurl.com/cspgyrn.

Running a similar system, he's reduced idle power consumption down to 8.5W, although this involves hacking the picoPSU and even the motherboard to help reduce the power consumption, which is a step too far for us. Even so, his projects helped us plunge to the 15W level without any hiccups and even go beyond that. If you think going below 10W is a challenge you're up for and you're happy to play around with a soldering iron, then he'll guide you through the perilous waters of hacking PSUs and motherboards.

It's an interesting low-level read on how you analyse voltages across power supplies and motherboard components. He explains how to go about taking accurate measurements – at this low-power level, measuring DC at tenths of volts becomes important.

He's done a more recent post in Dutch on his 'fluffy' project, which explains how you can measure voltages without the need to remove components. It's complicated stuff, but if you're interested in the engineering and maths behind the power converter and regulators on your motherboard, it's worth getting into. As the man puts it himself: "The core components never used more than 10W DC in idle anyway – before any mods. A modern computer loses most power as conversion losses in idle."

Try opting for DDR3L memory.



packing HD Graphics 3000 model, such as the Intel Core i3-2105. However, doing so tips you from the 35W TDP into the 65W TDP category, as it's built on the 32nm process.

Opting for the 22nm-based Intel Core i3-3220T provides a chip that retains a reasonable 2.8GHz speed with its twin cores and Hyper-Threading and one that runs within the 35W TDP. Opting for the HD Graphics 4000 or a faster 3.4GHz model bumps the processor up to 55W TDP. As it also turns out, the revised HD Graphics 2500, while running half the number of execution units of the older HD Graphics 3000, manages better performance per unit than the older model.

If we were going for low-power gold then the Intel Core i3-3217U, which offers a tiny 17W TDP with an enhanced HD Graphics 4000, would be very tempting – until you realise the GPU clock is crippled at 350MHz. It actually tempted Intel itself, as this is the processor chosen for the Intel NUC mini PC (see 'Intel goes NUClear' to the right). Our main turn-off for this model is the low 1.8GHz main core speed, as we feel the extra 1GHz will benefit us in the long run for general tasks and gaming.

If we weren't going for the lowest power, then certainly the Intel Core i3-3225 would be of interest. In a similar frame of mind, AMD hasn't so far been mentioned at all. That's because unfortunately when it comes to low power, AMD can't match Intel on the fabrication process technology. The AMD A10-5800K can slap the Core i3-3225 around in terms of GPU performance and pricing, but take a look at its TDP and it's 100W against the Core i3-3225 TDP of just 55W, while AMD can't build an A-series processor with a TDP below 65W.

MUMMY OR CHIPS?

Connected on a certain level with processor power usages is that of its particular chipset and motherboard. In the past, motherboard chipsets have been surreptitiously power-hungry. This was partly due to them being based on older fabrication processes. Added on top of that, older chipsets had to do a lot of donkey work, which has now been integrated onto the more efficient processor die. And let's not forget the benefit of the integrated graphics element.

We've chosen the mid-range Intel B75 chipset. This has a TDP of 6.7W while it offers all the advanced ports you'd be after, such as USB 2.0/3.0 and PCIe 3.0. On a 'being nice to AMD' note, its A-series Fusion Controller Hubs (FCHs) are actually competitive on power, dissipating between 4.7W and 7.8W. This certainly wasn't always the case, with the AMD 890GX chipset hitting 22W with its integrated Radeon HD 4290 graphics. Compared with say, the classic Intel 945 Express, this provided DDR2 dual-channel memory support and was released back in 2005. It had a TDP of 15.2W and had to be accompanied by a South Bridge I/O IC to provide PCI, LAN and USB support. This added another 3.3W for a maximum of 18.5W. Similarly, the Intel 915G with its integrated graphics pushed this to 16.3W, with its South Bridge using 3.8W, which topped out at 20W just for the chipset, never mind the processor.

The motherboard we've opted for is the MSI B75IA-E33, a mini-ITX unit that's based on the Intel B75 chipset. Technically, the Intel Z77 chipset has the same power dissipation, but these motherboards tend to be fully loaded high-end affairs and any extra ICs on there will add to the power requirements. So the super-slimmed version works for us just fine. Besides, it offers everything you'd want in terms of output anyway.

INEFFICIENT SUPPLIES

We're all aware of gold-rated 85% efficient power supplies, right? Well, turns out they're not under low-power conditions. That whole gold standard only applies to a PSU under full load. Hook up a low-power system or just a standard system that's idling along while you consider your insignificant position in this infinite universe, for example, and its efficiency will tank.

What does that mean to you? It means that a low-power system ends up sucking down more watts than it actually needs to, and not even by a small amount, as we'll see. For testing we'll be using a gold-standard 850W PSU as a benchmark and an older 275W Intel PSU to see how a lower-power yet unrated PSU can manage.

Lastly, we have a pico PSU from Mini-Box.com.au. This is a specially-engineered low-power PC PSU that's reported to be as high as 96% efficient. Its main disadvantages are that it's limited to 160W, uses an external power brick and has limited connections. While it does offer a full 24-pin ATX connector and the standard four-pin ATX12V connector,

INTEL GOES NUCLEAR

Earth-shatteringly energy efficient.

What we're doing here isn't really new. It's taking existing components and putting them together in the right configuration. In fact, a little outfit you might have heard of, called Intel, has done something similar already. The Intel NUC is a micro PC system much akin to the Apple Mac Mini. Inside you'll find an Intel Core i3-3217U processor running on an Intel QM77 Express chipset. This QM77 chipset is rated at 3.7W TDP, three less than the Intel B75.

The Intel NUC consumes a mere 11W when idle, so we're guessing the Intel QM77 chipset makes the difference here. But under a 3D gaming load this increases to 35W. Ha, in your low-power face, Intel! Also in the NUC's favour is that Intel produced a beautifully engineered case, while our system looks like the end results of a robot evisceration. Not that we're trying to do a case of ours is better than theirs, but you can expand ours far more... we're just saying.



Small yet powerful.



SYSTEM POWER USE

Super I/O
0.02W (0.28%)

Standby
0.12W (1.71%)

SSD 0.5W
(7.12%)

Miscellaneous
losses 0.9W
(12.81%)

Audio & inputs
0.21W (2.99%)

Networks 0.175W
(2.49%)

Memory 0.5W
(7.12%)

CPU 2.9W (41.28%)

PCH 1.7W (24.20%)

INTEL HD GRAPHICS

HD Graphics	CPUs	Clock speed (MHz)	Units	Shader	DirectX
HD (2010)	Ironlake	533/733/900	6	4	10
HD (2011)	Sandy Bridge	650 to 1,100	6	4.1	10.1
HD 2000 (2011)	Sandy Bridge	650 to 1,250	6	4.1	10.1
HD 3000 (2011)	Sandy Bridge	850 to 1,350	12	4.1	10.1
HD (2012)	Ivy Bridge	650 to 1,050	6	5	11
HD 2500 (2012)	Ivy Bridge	650 to 1,150	6	5	11
HD 4000 (2012)	Ivy Bridge	650 to 1,150	16	5	11
HD (2013)	Haswell	650 to 1,200	10	5	11.1
HD 4500 (2013, TBC)	Haswell	650 to 1,200	20	5	11.1
HD 5000 (2013, TBC)	Haswell	TBC	40	5	11.1

COMPARTMENTALISATION

Why we built what we built the way we decided to build it.

Throughout this feature we've covered why we've chosen certain components and why they're so good at saving energy. However, it's useful to put everything down that we've used in one place and count up the beans for a final tally. While the final amount isn't too high, it's certainly not the cheapest system we've built and if you select a different set of components, largely AMD-based, you're going to end up with a better-performing gaming system. What you won't end up with, though, is a better power performance.

It has to be said that the picoPSU certainly made a huge difference and shows just how much juice a flabby PSU can waste at low power. At \$80, however, it's a hard sell, especially when you can get a perfectly good

standard PSU that's way more flexible for \$50.

Beyond this main issue we're pretty happy with the Intel Core i3-3220T for the power levels it requires. As we point out, ideally you'd like an Intel QS77-based motherboard; the only issue is no-one seems to make one. But one of the micro-ITX B75 motherboards will do the job almost as well.

We personally find the option of a WD Green 2.5in drive very tempting. With capacities up to 2TB, it's going to supply most of the storage you could want on a system from a single 1.7W device. At that level it's competing well with most SSDs. Only the very expensive Intel 520 Series does significantly better, but that certainly sells for a premium.

it only offers a single SATA power connector and four-pin Molex. There is an even lower-power picoPSU option that omits the ATX12V connector, but for the modern PC systems we're after, that's not an option.

PERIPHERAL MATTERS

We're not quite done with selecting components for our low-power system. Hard drives can add quite a lot of power consumption to an overall system. In a standard desktop computer, a bank of four 3.5in spinning hard drives can actually consume upwards of 30W when under full access. Things are somewhat more subdued once they've spun down at 0.75W per drive.

Even SSDs don't get away with a free power ride here. Power use on SSDs can vary as high as 6W under load. This is as high as a 3.5in spinning drive, so thinking it's a solid state doesn't necessarily mean it's low power. We're running a Kingston V+200 SSD, which is rated at 0.5W idle and 1.8W under load. The best on the market, however, is the Intel SSD 520 with a load power draw of a just 0.85W.

In contrast we're also testing a Western Digital Green 2.5in 2TB drive. This offers SSD-matching power consumption, but without the capacity limitations. The load power draw is a very respectable 1.7W; while idle it's 0.8W.

The last element we're looking at is memory. Obviously, opting for a single DIMM rather than a dual configuration will help reduce the overall power required. Beyond this it's also possible to buy low-power DDR3. For the test we have an 8GB Kingston DDR3L DIMM that's rated at 1,600MHz and 1.35V, rather than the normal 1.65V for DDR3.

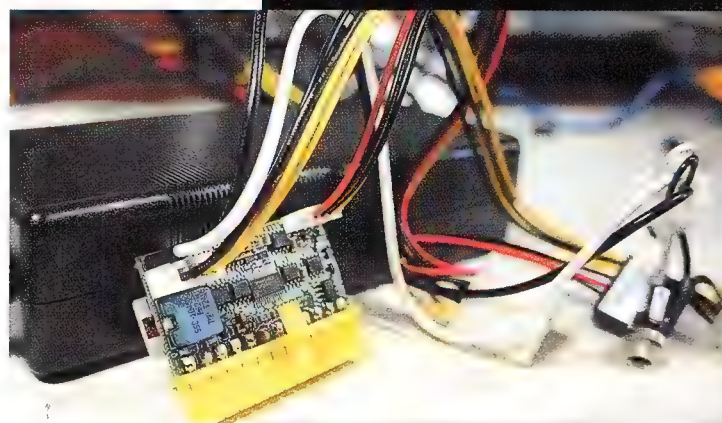
DIDN'T HE DO WELL?

Plugging this all together and powering it up off our standard test PSU (an XFX 850W model), we were pleasantly surprised to read idle consumption of 22W and a game load of 36W. At this point we cracked out our picoPSU and reran the system. Impressively, idle power consumption dropped to 15W (an improvement of 32%), while load dropped from 36W to 25W (an improvement of 31%).

There was chatter that lower-power PSUs could fare better, so we tested an older Intel 275W PSU from a BTX system. Clearly, the age of the PSU showed through, as the power draw of 28W at idle and 39W under load was significantly worse, with the picoPSU being around 47% more efficient.

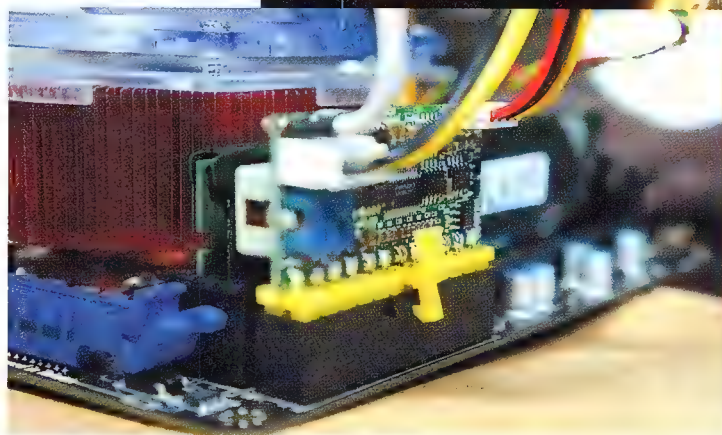
Of course, these initial results are through running the base BIOS settings. While many of the more useful voltage settings get locked out, we can at least tinker with a few settings. It's odd that the DDR3 memory defaults to 1.65V – we had already manually selected 1.35V and we also kicked the memory bus down to 1,066MHz from 1,600MHz. We also turned off as many of the onboard integrated chips as possible, such as the LAN and audio.

Annoyingly, many of the voltages and even the QPI bus speed aren't accessible, as we'd certainly be tempted to undervolt the memory controller VTT line, the memory VDIMM and main chipset PCH line. Underclocking the CPU from 2.8GHz to 2GHz had no effect on idle power consumption – we imagine that's because the processor powers down as



The pico efficient PSU.

Pico offers a full 24-pin ATX plug.



much as possible, no matter what the clock. Surprisingly, it also had no effect on the loaded power consumption.

All of this tinkering managed to drop the picoPSU idle power consumption down to a mere 13W idle and 23W under a gaming load. Even adding the WD Green 2TB 2.5in drive to the system wouldn't see this rise above 15W. As a gaming rig it's going to leave something to be desired in the speed department, but the fact is this is a system that can game if you need it to. At 13W idle, we almost match our plucked-out-of-the-air 10W goal and frankly brought desktop power consumption down to laptop levels. We think that's pretty impressive, especially since we haven't had to compromise raw CPU power. **BTG**

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Energy-efficient
with 3 x 15 years
in full operation

1.5W idle and
10W max power



Synology®

DiskStation DS413j

Schedule power
on/off and
Wake-on-LAN
support

100% full
operation at
16 V DC (4)

DiskStation DS413j

DS413j is a compact, multi-bay NAS device designed to work as your data storage cloud. It allows you to access data from anywhere without extra configuration. Sync data with PC and Mac, and securely enjoy unlimited bytes of multimedia content on mobile devices. You can stream videos and music in 1080p resolution TV and AirPlay systems.

DSM 4.2



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masterbuilder

BUILD YOUR PERFECT PC

NEW RIG DONE RIGHT

Gordon Mah Ung and David Murphy take you through the essential first steps for breaking-in a new PC.



Inventory your PC's hardware with Belarc to make sure you got what you paid for.

All expecting parents have read *What to Expect When You're Expecting* because when that little bundle of joy arrives, you'd better be ready with lots of paper towels and a whole lot of specialised knowledge about what to do from that moment forward. While it's not quite as messy (or scary), a new PC requires a similar sort of informed approach if you want to raise it properly. You'll be tempted to pick it up and coo, "who's a widdle PC?" and then immediately benchmark the shinola out of it. We understand the impulse and the excitement, but hold your horses, cowboy. You've got to take it slow with a new rig and get it set up correctly the first time, otherwise all your future efforts will be for naught.

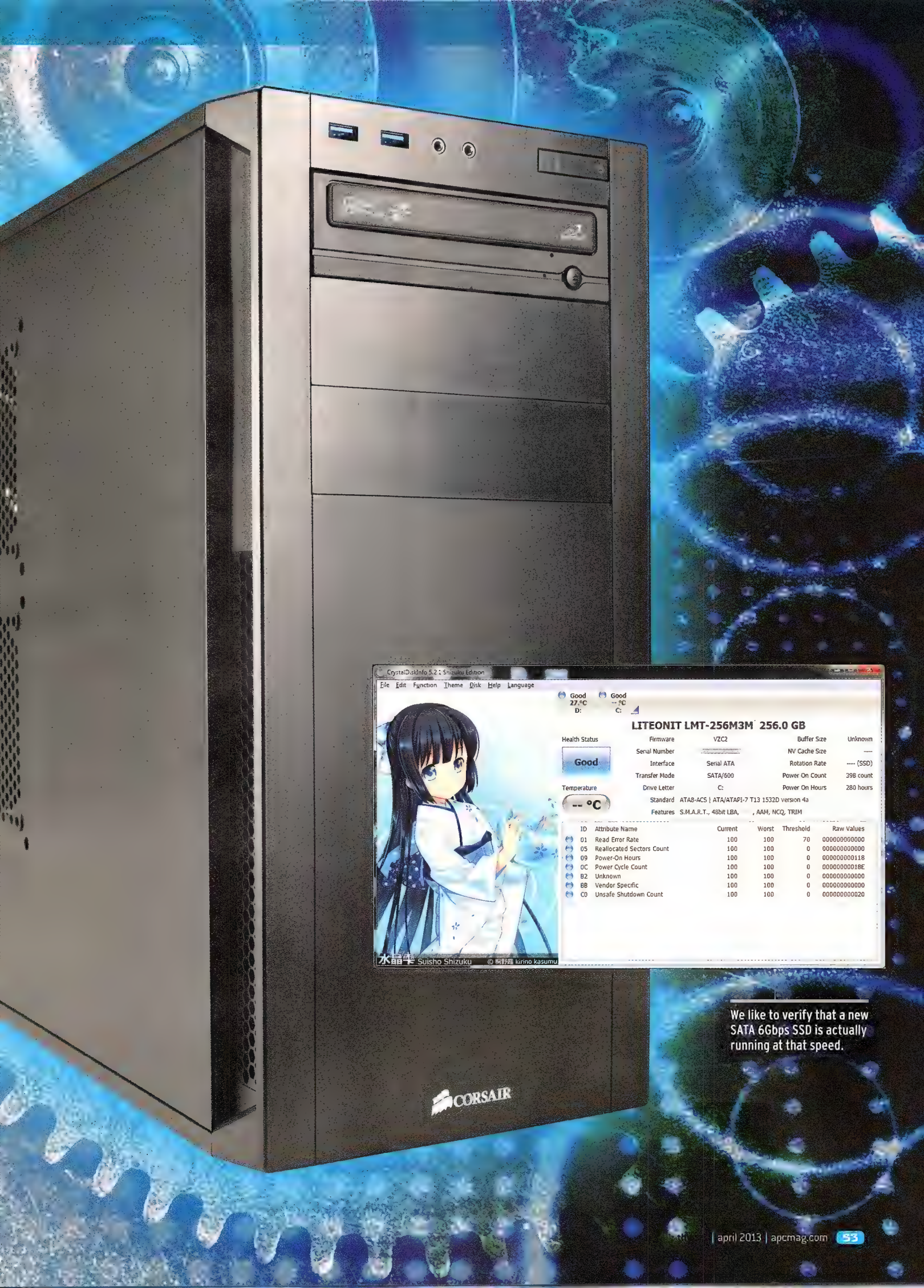
In this handy guide, we'll show you what to do with your new PC in those first crucial out-of-the-box moments and we'll hold your hand all the way from the first boot until the PC is ready to run its first benchmark. With our help, your bundle of bits will quickly grow from a fragile, schizophrenic rig to a fully up-to-date, crap-free machine that's secure, tweaked for maximum performance and ready to make daddy or mummy proud. Sniff – they boot up so fast!

KICK THE TIRES

You just unboxed your new desktop, all-in-one or laptop, but do you really know what's inside it? After all, like doctors, lawyers and journalists, system builders make mistakes, too. It's a good time to grab the spec sheet that came with your PC and do a quick system inventory check to make sure that if you paid for a machine with a \$230 CPU, you actually got that CPU. You can poke and prod through the specs using tools such as CPU-Z (www.cpubid.com) and GPU-Z (www.techpowerup.com) and check the Device Manager and BIOS/UEFI for hardware IDs, or just run a system audit using Belarc Advisor (free from www.belarc.com). Belarc Advisor will query the hardware and software in your PC, and present you with a tidy list of everything that's installed. Pay particular attention to what CPU is in your box, the SSD and HDD models and capacity, as well how much RAM and how many DIMMs are installed.

The inventory isn't enough, though. You should also verify some key parameters to make sure your box is running at speed. Run CPU-Z while also running the Prime95 (www.mersenne.org) stress test in order to record the clock speed the chip is running at. With various turbo techs being pushed, you might also want to see how your chip performs under light loads. We generally run the SunSpider browser benchmark (www.webkit.org) to try to coax turbo speeds out of our CPUs. While you have CPU-Z running, click the 'Memory' tab and verify that your box is running the correct memory channels.

Those of you running an SSD on an Intel system should verify that the drive is hooked up to a SATA 6Gbps port and that TRIM is enabled. Just download Crystal Disk Info (tinyurl.com/6x7xc3) to see what state is your SSD's run state.



CrystalDiskInfo 5.2.1 Shizuku Edition
File Edit Function Theme Disk Help Language

Good 27.0°C D: Good --°C C:

LITEONIT LMT-256M3M 256.0 GB

Health Status: **Good**

Temperature: --°C

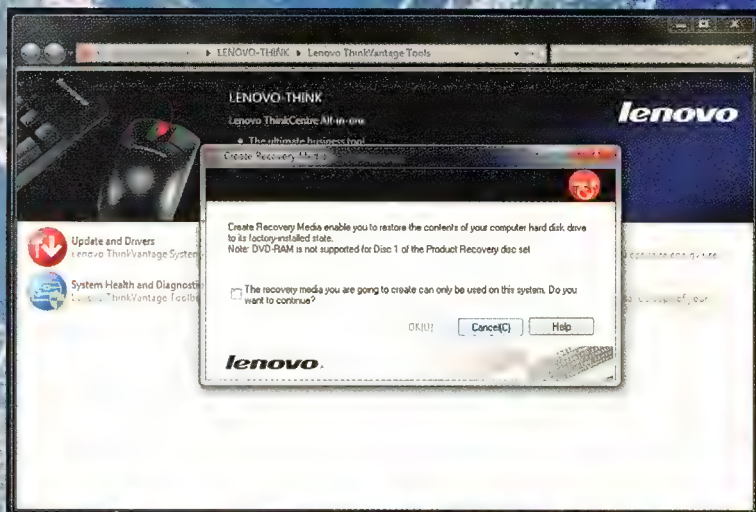
ID	Attribute Name	Current	Worst	Threshold	Raw Values
01	Read Error Rate	100	100	70	000000000000
05	Reallocated Sectors Count	100	100	0	000000000000
09	Power-On Hours	100	100	0	000000000118
0C	Power Cycle Count	100	100	0	00000000018E
B2	Unknown	100	100	0	000000000000
BB	Vendor Specific	100	100	0	000000000000
C0	Unsafe Shutdown Count	100	100	0	000000000020

Standard: ATA8-ACS | ATA/ATAPI-7 T13 1532D version 4a
Features: S.M.A.R.T., 48bit LBA, AAM, NCQ, TRIM

水鏡子 Suisho Shizuku © 桐野 暁 Kirino Kazumu

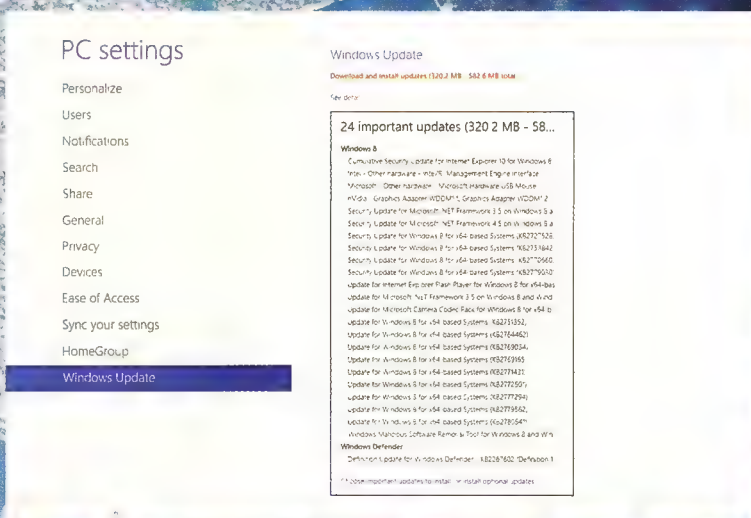
We like to verify that a new SATA 6Gbps SSD is actually running at that speed.

CORSAIR



Take the time to create factory recovery discs, since few systems ship with them.

Interestingly, HP allows you to create only one set of recovery discs.



Once your networking is up, run Windows Update immediately.

RESTORATION SOFTWARE

Old-timers will remember when every new PC would ship with a set of restore discs. Well, those days are over for most large PC manufacturers. And don't you kid yourself: even though Windows 8 has the ability to factory reset itself before your lunch break is over, the need for restore media persists. Windows 8's reset feature won't do squat if your HDD or SSD decides to go south, or if some OS fault or infection is so bad you need to nuke it from orbit.

It's not that Microsoft is preventing PC vendors from providing restore media, either – it's just that most PC OEMs don't want to pay for it anymore. Why bother if they can make you burn it instead? To be fair, the vast majority of folks never have issues and skip this step. We, however, like to hope for the best and plan for the worst, so burning the disc before your drive blows a motivator is the proper course of action.

Every OEM seems to handle restore discs differently, so hunt around on your system for the utility and look for the 'factory restore disc' feature. When we set up a new box recently, the first thing we did was burn a set of restore discs and then taped them to the back of the PC.

If your new notebook doesn't have an optical drive, consider creating a recovery USB key (which most factory utilities support as an alternative to creating discs). Just make sure it's big enough – a Windows 8 Pro installation asked for a minimum of 23GB for our factory image.

THE NUCLEAR OPTION

Rather than trying to remove the megabytes of trialware your OEM has preloaded on a new machine, some enthusiasts prefer to forgo the hour spent uninstalling unwanted crap and reach right for the nuclear launch codes instead. Yep, that's right, they take a perfectly good, brand-new PC and immediately nuke and pave over the OS with a full, clean install. In the days of Windows XP, such an option probably made a lot of sense, but factory preinstalls of the OS from large OEMs are quite complicated and messy. What's more, the factory restore will quite likely contain all the same trialware. While nuking the OS from orbit was perfectly acceptable to many of us years ago, these days we think it's just easier to declutter the box by hand.

Still, there are times when the nuclear option is preferable. Some OEMs prefer to ship with a 32-bit version of the OS installed for compatibility reasons, but make both the 32-bit and 64-bit versions available. In this case, nuking the OS and installing the 64-bit version is required if you want to upgrade to the latter.

WINDOWS UPDATE IT!

With your new PC connected to the internet, the absolute first thing you should do is manually run Windows Update. Once it's done, run it again. Why? It's not because Windows 7 and 8 are particularly soft targets, although as the world's dominant operating systems (well, Windows 7 anyway), they're basically the biggest targets around. With the dangers of infected Flash ads, JavaScript exploits and an untold number of threats poised to attack unpatched machines, wading into the internet with an unpatched box is about as wise as running buck naked and blindfolded into a cactus patch.

So before you step one foot onto the internet, run Windows Update at least twice – some updates require the presence of a preceding update in order to be installed. Then you can run out to procure the other much-needed utilities and tools for your new PC. On Windows 8 machines, go to the Modern UI and start typing `update`. On Windows 7, go to 'Start' and search for `update`.

IF IT'S BROKEN, FIX IT

Drivers are usually a work in progress and they're often the cause of system wonkiness, even on brand-spanking-new machines. In fact, new machines are often the ones most in need of updated drivers, given their state-of-the-art hardware. Case in point: we unboxed a new Windows 8 laptop for some testing and immediately had to update no fewer than four drivers.

This is where the big-boy 'tier one' OEMs often have the edge over the smaller companies. Most pack their own driver update applications that will hunt down the latest drivers for their machines. On an HP Windows 8 laptop, for example, rather than having to chase down individual drivers, the HP update app did the work for us. This can work against you on occasion, though, as big companies often don't want

headaches, so once a driver reaches a certain level of stability, they don't push new updates unless they're absolutely needed, even if the new driver may add improved features or performance. In that case, a manual search will produce more satisfying results.

If you don't want to hunt for every single device driver by hand, there are alternatives, such as Slimware's SlimDrivers Free (www.slimwareutilities.com). This utility uses crowdsourcing to do what the large OEMs do with their driver updates. For example, running SlimDrivers Free on another big OEM laptop yielded 14 updated drivers, while the OEM's update tool said nothing new was available.

Which drivers do we typically recommend you update on a new box? The most obvious are GPU drivers. Next up would be chipset drivers. We'll add that the results of driver updates will vary depending on your OS. Windows 7 is quite mature and drivers at this point are unlikely to add much beyond bug fixes. However, Windows 8 is constantly changing, so the GPU, chipset, audio, USB, network – basically everything – should be checked for new drivers and generally installed.

BEWARE THE BIOS

We used to believe the conventional wisdom that if it ain't broke, don't break it by touching it. But not when it comes to the BIOS. We've experienced so many fits of weirdness that were fixed by updating the BIOS in the last couple of years that we now recommend updating the BIOS/UEFI as a top priority on a new PC. We've seen Wi-Fi that wouldn't install properly get fixed with a BIOS update, and overclocking-gone-wacky similarly remedied, so we say just do it.

Even on laptops, which many people believe don't need a BIOS update, an updated BIOS can correct serious performance issues. Case in point: the BIOS often has direct control over acoustics on a laptop. Updating the BIOS could add new fan profiles that either make the laptop quieter or enable higher turbo clock speeds because the fan will spin up higher. You simply don't know. Even more interesting, newer machines, especially new laptops, often benefit the most from BIOS updates, as the engineers tweak them in response to the feedback they're getting as the products actually reach consumers' hands. Since BIOS updates are often handled differently for each PC, we can't walk you through it step by step, but we recommend that you visit your vendor's web site to check the BIOS versions and/or run any built-in update utility to check for a new BIOS.

LIGHTEN THE LOAD

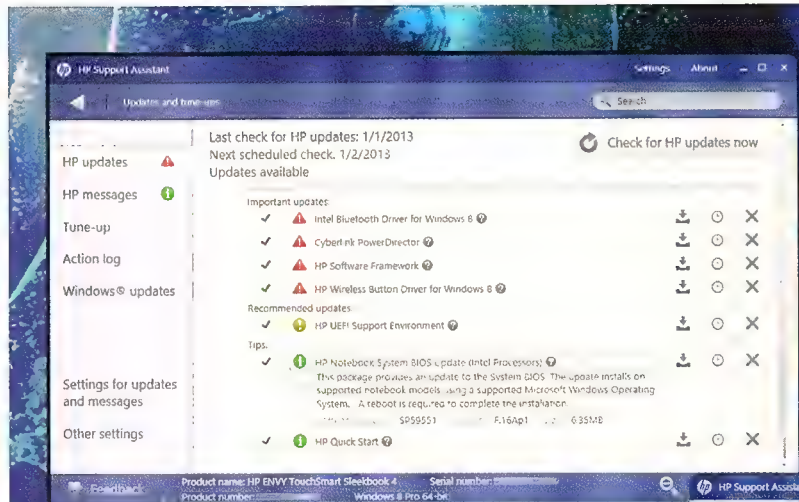
Do you know how you got your PC at such a fantastic price? Well, it's partly the result of the preinstalled and subsidized trial software. So while you gnash your teeth at the 12 trial apps clogging your hard drive, remember those same software vendors helped pay for your new rig.

So please mouth a quiet thank you and then download PC Decrapifier (www.pcdecrapifier.com). This handy utility will let you quickly and easily uninstall most of the preinstalled software in one single swipe. And after you're done blowing out the hundreds of megabytes of trial software with as much effort as it takes you to eat a delicious Big Mac, also thank your PC for even letting you uninstall the trialware, unlike your blasted smartphone, which has precious, precious space being wasted by trial apps you never, ever use. Freedom!

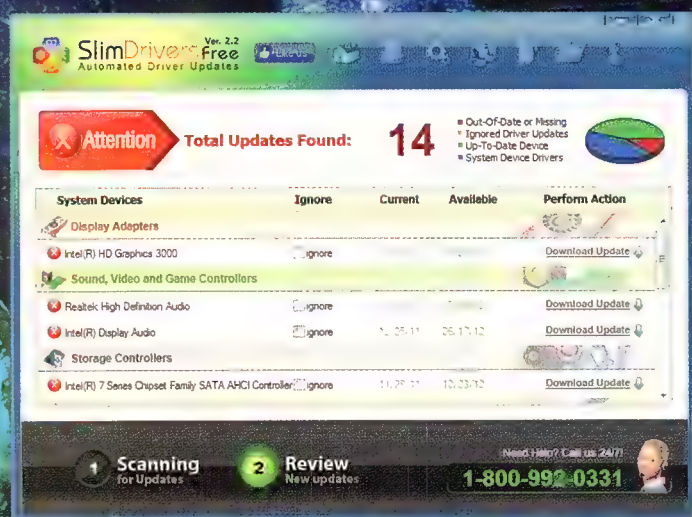
CLUTTER IT UP

You just spent an hour decluttering your new PC of trial applications (if you didn't use PC Decrapifier), now it's time to clutter it up – your way. Rather than download each app one at a time, point your browser at ninite.com. Once there, you're presented with a page of popular applications that just about everyone installs on a new machine: Chrome, Dropbox, Foxit Reader, 7-Zip, Steam, TeraCopy, Revo, Digsby, VLC and so on. Simply scroll through the list looking for an app, utility or runtime that appeals to you and check the box. Once you've picked from the menu of software, click the 'Get Installer' button and you'll get a small executable to download. Once you've downloaded the executable, run it and Ninite will automatically download and install the software you selected. The only improvement we wish Ninite had is an enthusiast utility selection that includes CPU-Z, GPU-Z and other handy tools we all use.

While we're on the subject of installing software, if you're planning to install free antivirus software, you can do that with Ninite as well, which gives you the choice of Microsoft Security Essentials (MSE), Avast and AVG for real-time scanners, and Malwarebytes, Ad-Aware and Spybot as

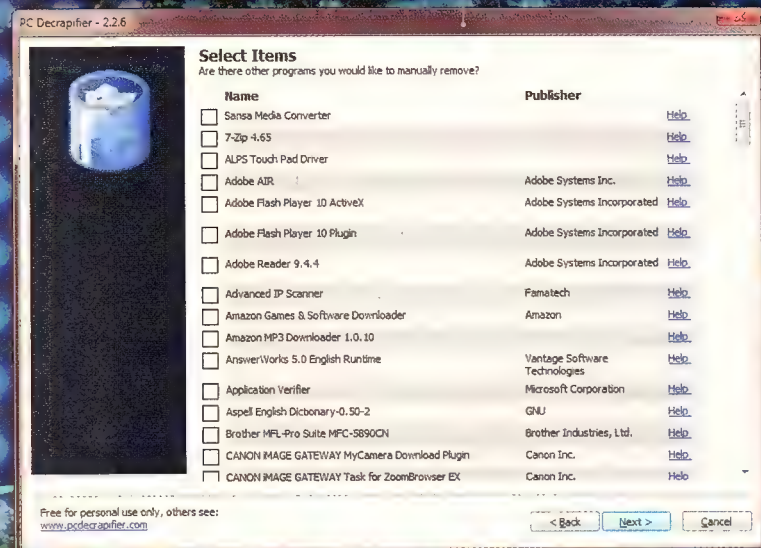


Take advantage of integrated driver update tools on your PC.



Slimware's SlimDrivers Free hunts down new drivers for you.

We love how easily PC Decrapifier makes it for us to bid adieu to unwelcome preinstalled software!



secondary, on-demand scanners. SuperAntiSpyware is also an option, but the app has real-time protection, which may be an issue for any AV app you run. More on this later, but if you're going the cheap route with AVG, MSE or Avast, now is the time to do it, or install a paid solution. For your information, Windows 8 boxes come out of the, um, box with the creaky old MSE installed and running.

SECURE IT

Your work is just getting started after you've installed an antivirus product. The old school scan-your-drive-for-an-infected-file model has long been worthless. These days, malware is often installed in a nanosecond, using zero-day infections via broken browser plug-ins and scripting exploits. As much work as Microsoft has done to enhance security in the latest versions of Windows, that doesn't help if you have an unpatched version of QuickTime, VLC or Adobe Reader.

First, we recommend that you consider paying for a good antivirus product such as F-Secure, Kaspersky, Norton or BitDefender. These products are highly rated for their ability to intercept zero-day attacks and with rebates, you can get enough keys to cover all your devices for a few dollars a year. If paying for security isn't an option, consider using AVG Free, which is better at stopping zero-day attacks than MSE. MSE is the least bothersome, but it's lost a lot of lustre of late.

With a proper antivirus app in place, you now need to be wary of your browser plug-ins. We recommend regular checks of your browser using Qualys BrowserCheck (browsercheck.qualys.com). This free web tool will check your browser's plug-ins to see if they're the latest available. The intermediate and advanced options offer checks of all browsers as well as Windows Updates. Keeping your applications updated is also a key to avoiding infections. For that, we turn to Secunia PSI or the web-based OSI (www.secunia.com). Secunia's tools will check your installed apps and inform you if there are any risks, and either automatically download them or offer you a download link.

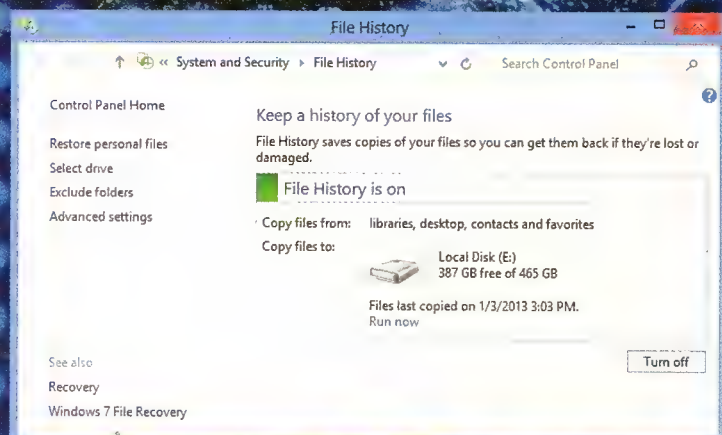
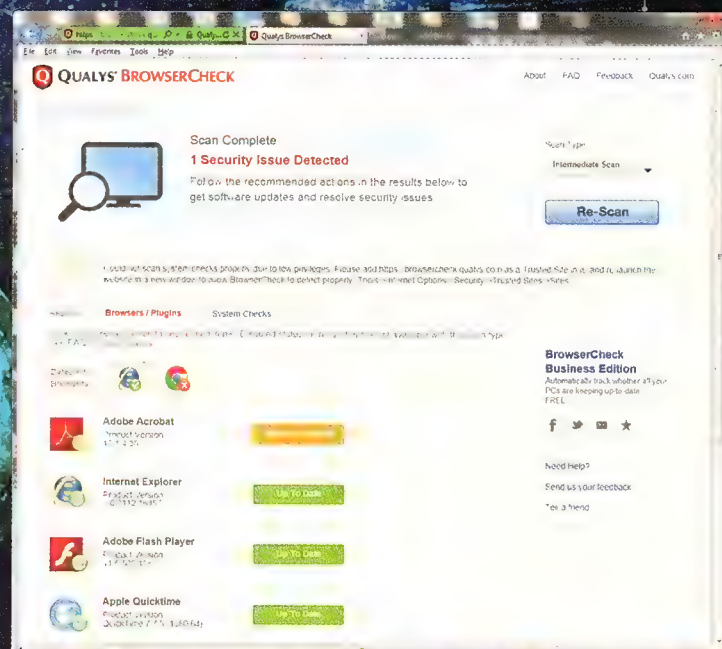
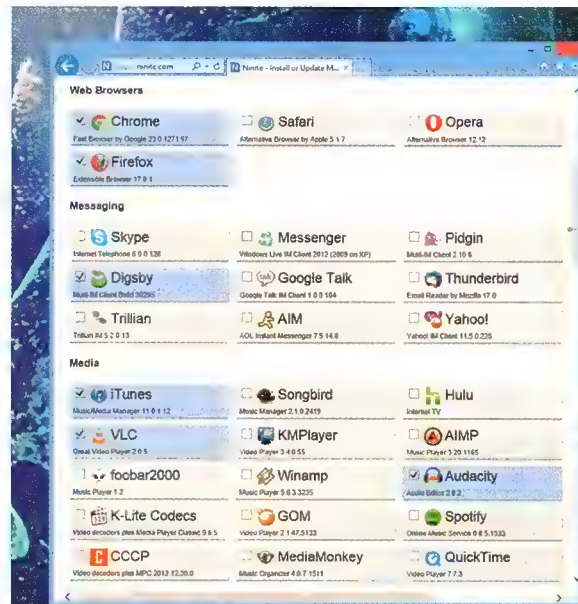
Running two antivirus apps isn't recommended, but keeping one around for a second opinion isn't a bad idea. We often keep Malwarebytes installed just in case we need it. You should also consider installing VirusTotal Uploader (www.virustotal.com). This program lets you right-click a file to have it sent to VirusTotal, where it will be analysed by more than 40 virus engines. If you suspect a process is malware, you can use VirusTotal Uploader to send the executable that's running the process to be analysed. This is only the tip of the iceberg. Just remember security guru Bruce Schneier's words: "Security is not a product; it's a process".

HAVE A BACKUP PLAN OR TWO

The system restore discs you created earlier will get you back in business should you experience a total meltdown, but you should also strongly consider setting up a backup plan now, not a day after your drive has died and you've lost all your data. For those times, we've found Windows 7's Backup and Restore to work amazingly well, so you'll need a second drive on the machine for the backups; we highly recommend that its capacity be equal to or larger than that of your primary drive.

With a USB optical drive plugged in or a second HDD in place, use Backup and Restore to create a system image and then burn a boot disc, which you'll need should your drive fail. Also set up a file backup from your primary drive to your secondary drive and set it for a schedule that you're comfortable with. In the event of a primary drive failure, just replace the drive, boot to the restore disc you created and point it at your backup images and files. When completed, you should be back in action with access to the files you had just before the failure.

Windows 8 users can set up the same file and image backup system from Windows 7, but it's called Windows 7 File Recovery. Just pull up search, start typing **file recovery** and look under 'Settings' to access the same utility. Windows 8 actually has different options: File History will create backups on a file every hour, whereas Windows 7 File Recovery will run only once a day. What's better? Since our time and data is invaluable, we do both. File History is the Omega 13 of backup that lets you, say, go back to a file version from three hours before. 'Refresh' is a great feature that 'resets' the OS, but it won't help if the drive has died. In that case, having a disc image and Windows 7 File Recovery backup set lets you drop in a new drive and be back up and running in a couple of hours, rather than the usual 12 hours of manually installing apps and recovering settings. **ABC**



Not to be confused with the Windows 7 File Recovery, Windows 8's File History makes hourly backups of your document files.

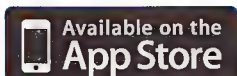
Ninite.com automatically installs all your popular apps and utilities in one swoop.

Staying on top of the state of your browser plug-ins is key to a good security regimen.

apc



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iPad is a trademark of Apple Inc., registered in the U.S. and other countries. App Store is a service mark of Apple Inc.

Windows 8 Store

THE KILLER SOFTWARE

Microsoft's Office 2013 comes with some significant improvements. [Bennett Ring](#) explains.

Much of the early discussion about Microsoft Office 2013 has focused around its availability as a subscription product and the fact that you can no longer buy it on removable media. Even if you buy the new Office for perpetuity as a standalone product, you can't download and keep install files for any of its three editions: Home & Student, Home & Business and Professional. This is all about Microsoft wanting to make us subscribers of its software, in which we effectively rent it from Microsoft for a fee. When we streamed our version (the subscription version, Office 365 Home Premium) on what we thought was a reasonably fast ADSL 2+ line at home, it took over half an hour to download.

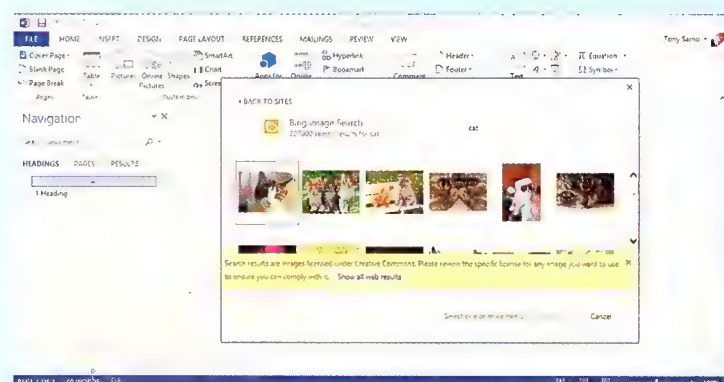
Let's look at some of the actual features of the new Office 2013. Leaving aside the brutally minimalist, flat, de-coloured look, there are several new features that improve on the previous versions of Office. In the email program, Outlook, you can now see the contact details of people on an email chain, such as their latest profile picture if you're on the same social network. Looking up your calendar is also easier because you don't have to flick between windows, you just hover over the calendar button and the calendar will pop up.

In Word, the Ribbon gets even thicker when you're using the word processor with a touchscreen, while integration with the Bing search engine provides something called 'Online Pictures', which lets you search the web for images (see, you don't have to rely on the execrable clip art). But it's when you save your document that you really know you're in Office 2013: Word now lets you save to SkyDrive (Microsoft's cloud storage) by default. It means that if you open your file from another Microsoft device such as a tablet, you can see where you were last editing the document, as well as various versioning options.

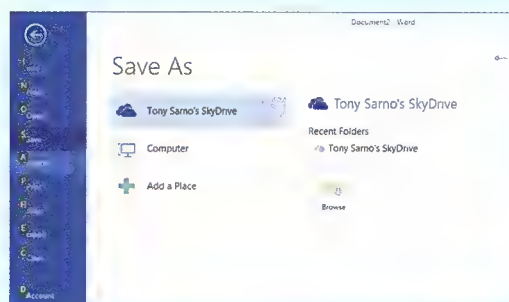
In Excel, you get easier adjustment and previewing of graphs, lots of new save options just like in Word and a new supercharged version of autofill, which can extract more kinds of data from columns with multiple data types. And if you use pivot tables, Excel 2013 now has the ability to create them automatically.

In PowerPoint there's an absolute killer feature. If you regularly make presentations with PowerPoint, this new feature is worth the price of the entire Office suite alone. It's a new presenter's mode that lets you have a different view of your slides than what the audience sees. It means you can finally have additional information on your slides that your audience won't see, which helps you make a more polished presentation. And it's now also possible to zoom into parts of the slide, vaguely reminiscent of the Prezi presentation software. And lastly, it's far easier to embed code from an external video into a slide.

All the Office components also benefit from the 'Sharing' screen, which gives you options for sharing your document with other people. This includes via email and SkyDrive, but also by publishing the document so it can be read in a web browser when you send people the link. And of course, there's the obligatory ability to post it to a blog, with a nice selection of supported platforms ranging from WordPress to TypePad.

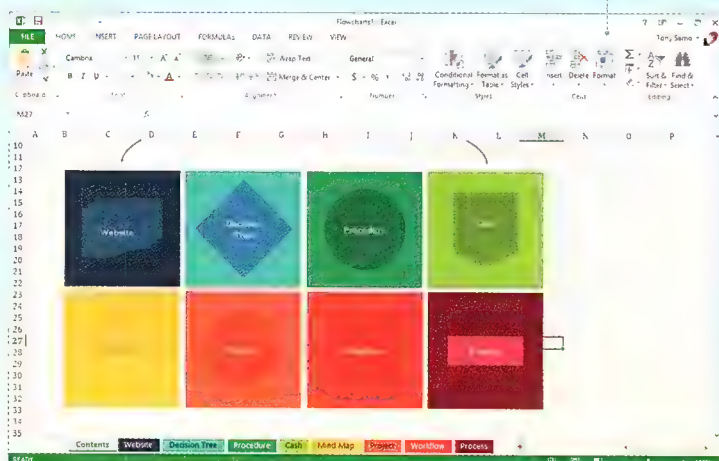


You can now search the web for pictures to insert into your Word documents with the 'Online Pictures' search.



Share your Office docs with others via email, SkyDrive, web browser and blog.

Excel comes with some great new templates.



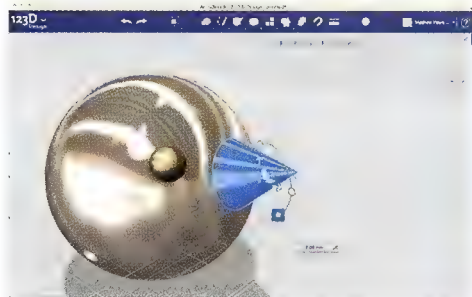


Mac Store | APPS

123D Design

Free | Autodesk
| tinyurl.com/by4mztm

Autodesk built its name on expensive high-end graphics programs for professionals to use, but in recent times it's developed a following for inexpensive and even free apps for people to muck about with on Macs and tablets – no training required. 123D Design is the latest of such offerings. It's free and comes with a bunch of prebuilt primitives and 'kits' that you can use to start building your own creations while you get used to how it works. The coolest bit is that once you've built something, you can send it off to one of three services for 3D printing. Costs vary, but if you get a Premium membership with **123Dapp.com** (which costs US\$99.99 per year), you get four prints included. If there's a better, less expensive way to muck about with 3D sculpting and printing, I don't know it.



Rail Maze

Free | Spooky House Studios
| tinyurl.com/a9cowos

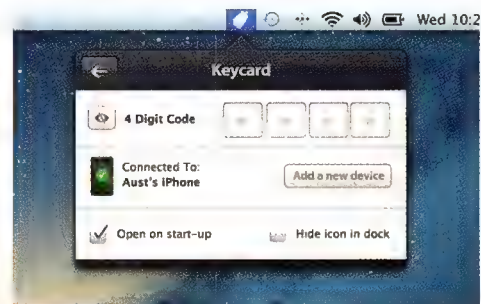
If you think it's confusing enough putting together a model train set, imagine the fun you'd have trying to figure out how to put together a set that someone else has already assembled – incorrectly. That's basically the premise of *Rail Maze*: get your train from the start to the finish by placing curves, straights, tunnels and whatnot where they need to be so you don't run off the rails. Some levels even have a 'pirate train' that you have to avoid. It starts off pretty easy, but quickly escalates to a maddening puzzle that will challenge your ability to plan ahead and think logically. The basic game is free, but you can pay for more levels, extra styles of gameplay and solutions (I like that you have to pay for the solutions – cheating shouldn't be free).



Keycard

\$8.99 | Appuous | tinyurl.com/an53xt5

This utility is a great idea that needs a bit of work. Give it an update or two, though, and this will be magic. The idea is simple: pair your phone and your computer, and when they're out of Bluetooth range, the computer locks. When you're back in range, you can unlock the computer; if you're not in range there's nothing anyone can do to get at your stuff, even if your password is written on a Post-it stuck to the screen. Not that anyone reading this would ever do that, right? Unfortunately, it's a little buggy (which may be the fault of the Mac rather than the app – it's hard to tell) and is prone to locking when my iPhone is on my desk, or not noticing when I've sat down again. Until that works seamlessly, it's hard to recommend, although it's worth encouraging the developers to keep at it.



Disk Doctor

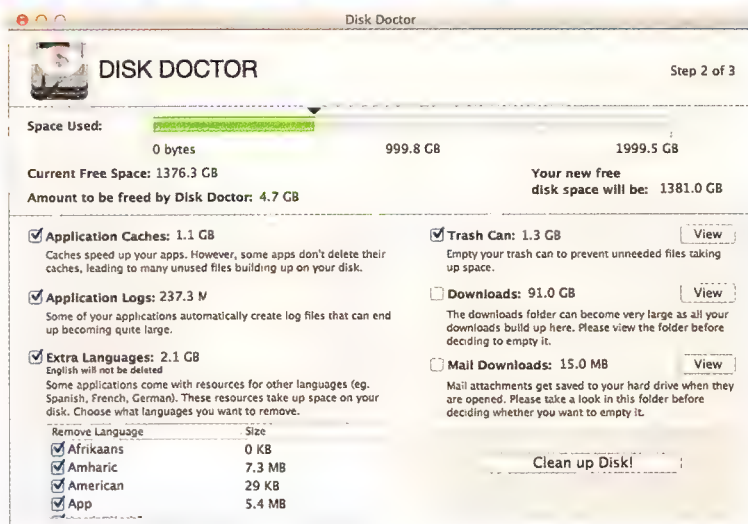
Clean up your Mac.

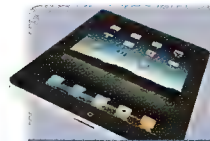
\$1.99 | FIPLAB | tinyurl.com/bd5xmxo

A lot of unnecessary junk is installed with Mac OS X – additional languages you'll never use, for example – and more junk builds up as you go along. Some utilities create log files that just grow and grow on the off chance you might ever need to refer to them, even if you don't.

Getting rid of some of this detritus can clear up much-needed hard drive space and even speed up your system if it's particularly clogged. Unfortunately, it's often difficult to find some of this stuff and even harder to know what can safely be dumped and what needs to stay.

Disk Doctor finds the junk and – if you want it to – gets rid of it for you. All with just a few clicks.





App Store | IOS APPS

Real Racing 3

Free, yet expensive?

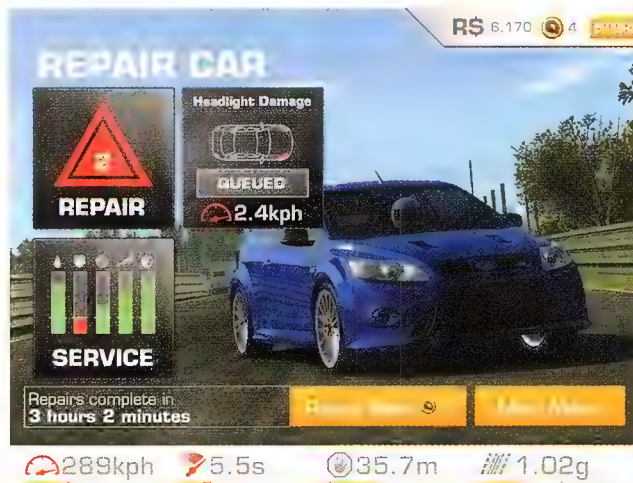
Free | Electronic Arts | tinyurl.com/RealRacing3

Ever since *Real Racing 3*, developed by Australian coders Firemonkeys (formerly Firemint, of *Flight Control* fame) was demoed on stage with the launch of the iPhone 5, it's been the single most anticipated game on iOS. At last it's here and it doesn't disappoint.

The graphics are superb, the physics of driving fast cars unparalleled and the use of time-shifted multiplayer (TSM) to compete against your friends' races, regardless of when they drove them, makes it incredibly immersive. It makes for a compelling racing game experience.

As Firemonkeys said at last year's demo, it's hard to believe you can do this on a phone.

There's an extra treat for Australian racers, in the form of a track around Melbourne's CBD. If you thought driving in Melbourne was crazy

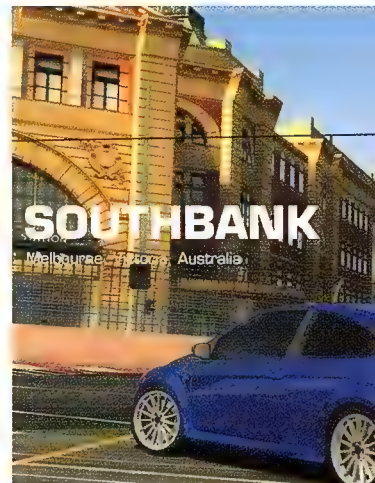


enough just with trams and hook turns, wait until people are trying to knock you off the road at high speed.

My one complaint with the game is the 'freemium' model that it uses, wherein repairs, servicing and upgrades all cost in-game money, although they cost more than you can easily earn just through gameplay. So you need to spend real money to get more or you can't

keep racing. Without spending extra, repairs can take hours – literal, real-world hours – during which you can't race because your pretend car is in the pretend garage for pretend repairs. I'd pay extra for the game if that weren't the case.

Nonetheless, it's the best racing experience that you'll find on a mobile device and better than you'll find on most consoles.



Gesundheit!

\$1.99 iPhone, \$2.99 iPad | Revolutionary Concepts | tinyurl.com/bpedxxs

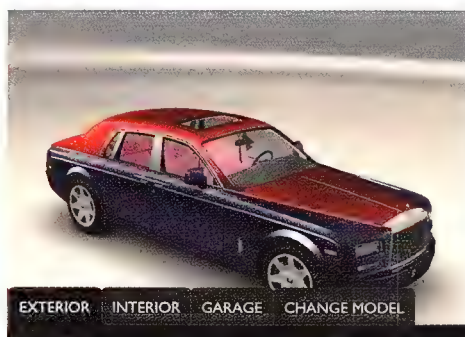
You wouldn't think a game whose tag line is 'snot happens' could be beautiful, but *Gesundheit!* somehow manages it. Basically, you're a little green pig and you go about collecting star fruits. Stopping you from doing so are a series of walls, opened by pressing strategically located buttons, and big red monsters that will (if they catch you) eat you. Thankfully, their appetites are sated by the consumption of mucus, which you can produce on demand to lure them away from where they'll see you, and towards traps. It's a simple concept gloriously executed.



Rolls-Royce Phantom

Free | Rolls-Royce Motor Cars | tinyurl.com/aayulzh

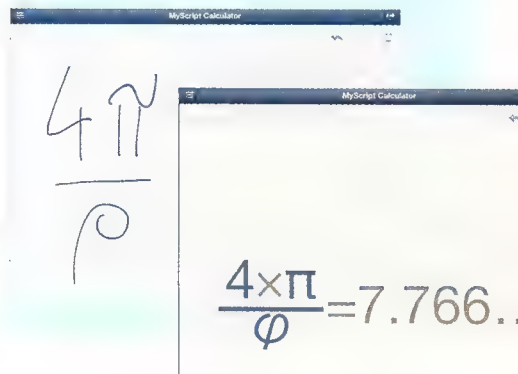
OK, this app isn't going to be for everyone, but if you've ever fantasised about owning a Rolls-Royce – in particular, about sitting in the showroom and designing one to your own unique specifications – then this is a lot of fun. If you're not exactly in the market for a Rolls just this minute, you can download the app and create the car you'd like one day. Choose colours (either from the preset palette or create your own from a photo), upholstery, wheels and wood veneer.



MyScript Calculator

Free | Vision Objects | tinyurl.com/axp2x42

I've wanted this ever since the first iPhone: a calculator that you use simply by writing numbers on the screen. MyScript Calculator uses handwriting recognition to interpret what you've written and then produces the answer. As well as basic arithmetic, it supports more complex operations involving square roots constants, Greek letters and stuff, which is very cool. However, once you have your answer, that's it – you can't use the answer to one problem as input for the next. I hope that's coming in an update.



Google Play | ANDROID

Chomp SMS

Free | Delicious, Inc | tinyurl.com/adf2t5h

Chomp SMS is my favourite replacement messaging program, as it doesn't bog itself down with unnecessary features. It still supports a few of the superfluities I've come to love, such as themes and emoji (both are additional, free add-ons). It also supports my two must-haves: delayed sending, giving me a few seconds after hitting 'Send' in which to cancel the SMS because typos only appear after sending; and scheduling, which means I can write that love Haiku when the inspiration comes to me at 3am, without losing brownie points by actually sending it then.

enough

Are you up for a and some ?

As long as you don't drink too much and end up

Well if you're going to be like that forget it

21/70 (1)

Stop

Tasker

The ultimate app for task automation.

\$5.99 | Crafty Apps | tinyurl.com/alayezh

There are many Android users out there for whom the mere mention of Tasker will bring a proud tear or two to their geeky eyes.

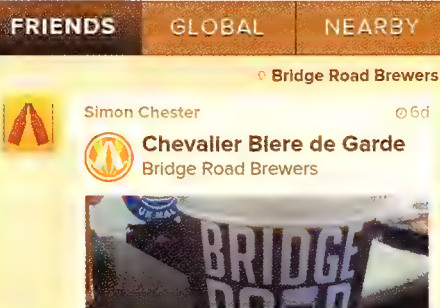
The reason for this pride comes from the unmitigated power that this app is capable of. If you want your phone to do something automatically, you can bet your best pair of trousers that Tasker can handle it.

The premise behind the app is quite simple: when something happens, have it trigger something else. For instance, when you get to work, have the app turn down your volume, change your ringtone to something more professional, update your GTalk (or other IM) status to 'DnD', and update Twitter to tell the world you've arrived and are generally displeased with the thought. Or, when you plug your phone in at night to charge, have it automatically upload the day's photos to Dropbox, turn off the vibrate function

Untappd

Free | Untappd | tinyurl.com/bv3jw2r

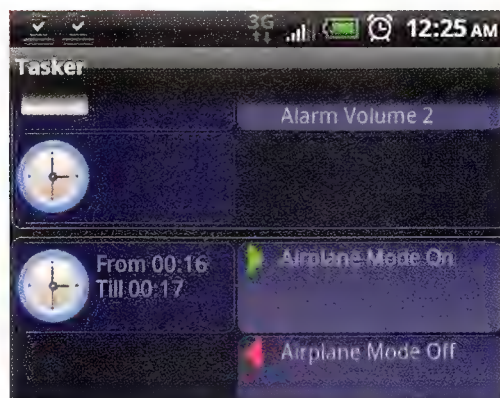
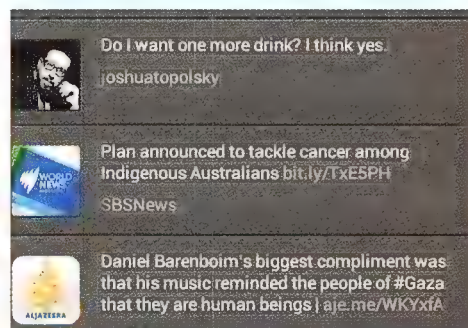
Untappd is like Foursquare for beer, only the idea behind it isn't that you check into a venue, it's that you check in a beer. So, every time you suck down a cool Juan, you check it in. And just like Foursquare, you earn badges for doing certain beer-related things. However, you can also see where and what your friends are drinking and then go stalk them, or see who's drinking what nearby, so that you can awkwardly approach strangers and attempt a conversation over your common interest in cherry lambics.



TweetDeck

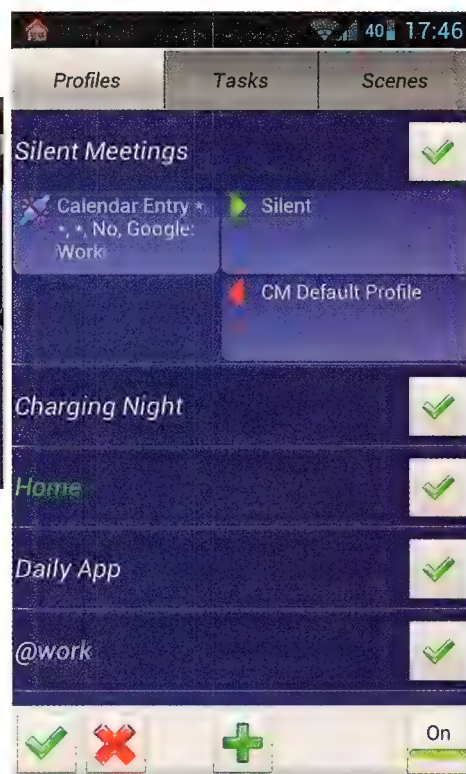
Free | Twitter, Inc | tinyurl.com/6sl54jr

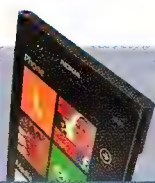
TweetDeck offers a beautiful user interface, as well as my favourite feature: the ability to simultaneously post to multiple social networks at once, including Twitter (duh), Facebook and Foursquare. Development has all but ceased, since Twitter now owns it and is putting all its efforts into the official app. However, the ability to post to multiple networks and to be able to launch the composer from a shortcut (I have it set to launch from my unlock screen) make me keep it on my handset.



(because we all hate being woken by the harsh bark of vibrating plastic against wood), turn down the volume, dim the screen and set your IM to 'invisible'.

The real strength lies in the myriad of events, states and actions (there are over 200, and more via plug-ins). It's not the easiest app in the world to set up, however, so make sure you read the help information ('Menu > Info > Support') or visit tasker.dinglish.net.





Windows Store

WIN PHONE 8

Skulls of the Shogun

Turn-based strategy done right for mobile.

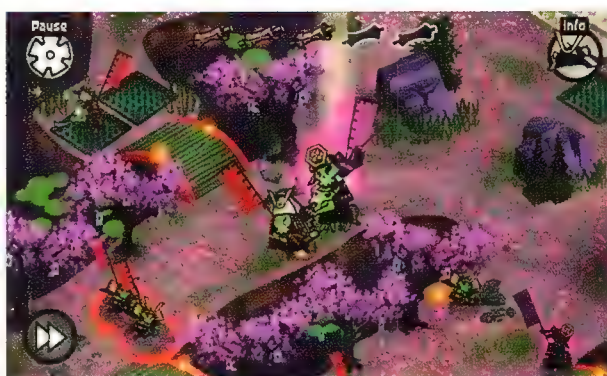
\$5.49 | Microsoft Studios | tinyurl.com/asad3yq

Skulls of the Shogun is a turn-based strategy game released through Xbox LIVE, which features cross-platform play between Windows Phone and Windows RT.

You control the recently killed, almost-Shogun Akamoto, as he commands his undead (or, actually dead) army to reclaim his rightful position in the afterlife. As such, expect skeletons, demons and a generally grim (yet rather adorable) aesthetic. You have five turns per round to command three unit types: infantry, cavalry and archers.

A unit's strength is regained when it feasts upon the skull of a vanquished foe and if a unit eats three, it gains super-badass demonic powers, which up its stats and allow it to take multiple turns.

As it's a phone game, it's been simplified just the right amount to retain the fun of strategy games, without such overt complexity as is available on PC. As a result, unlike the



PC counterparts, levels take anywhere from around 15 minutes to around an hour to complete – perfect for the mobile nature of phone gaming.

In this sense, it can also serve as a bit of a gateway for people new to the strategy genre,

helping them master some of the simpler concepts before diving into something more badass, like the *Total War* series.

The game is a joy to play (albeit with a few kinks that will hopefully be ironed out soon), with beautiful graphics and addictive gameplay.

Photostream

Free | Brandon Ayers | tinyurl.com/bg6rpgm

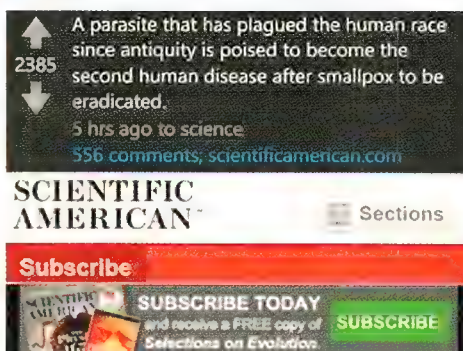
The lock screen is one place where you can add a touch of your own personality to your handset, although sometimes it can be difficult to choose an image, and I grow bored rather quickly. I relish in the ability to add a rotating, random beautiful photo to my lock screen, by having Photostream choose either a random Flickr or 500-pixel 'interesting photo'; one from a selected group, user or keyword, or one from my local or SkyDrive image albums. Neat.



Baconit

Free (donate version \$2.49)
Quinn Damerell | tinyurl.com/aujgdle

If you're addicted to reddit, you'll need this app. Baconit does everything any reddit addict could possibly need and it does it in an attractive, responsive UI. There are too many features to list, but some of my faves are: synchronised visited links between phones and browsers; multiple accounts; endless subreddit scrolling, posting, editing and deleting stories and comments; link and image submission; and a Live Tile with your karma or unread message count.



Snake '97

99c | dsd 164 B.V. | tinyurl.com/ak27ml9

Revel in the sweet stink of nostalgia with this nod to the days when ringtones were really monotonous, screens were green and grey, phones didn't quite fit in your pocket and the covers were interchangeable. It's just like maths class all over again, only I don't have to make up excuses for not doing my homework. Bonus: if you own a Nokia Lumia, there's something truly meta about tapping the emulated keypad of the 8210 on a touchscreen bigger than the original handset.

game mode





App World | BLACKBERRY

Dictionary+ for PlayBook

\$2 | XLabz Technologies Pvt Ltd
| tinyurl.com/a6gzdk8

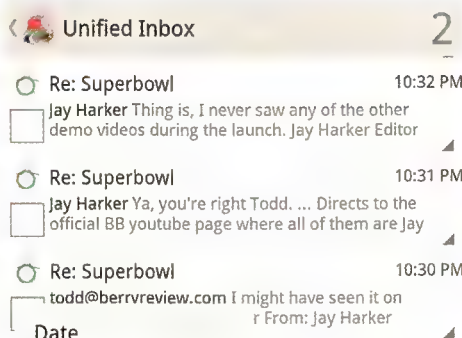
Sometimes the best apps are the ones with a simple purpose. I hold that having a good, offline dictionary is critical, especially when I'm reading older books on the device and stumble across an antiquated word, or similarly with a thesaurus, if I'm struggling to find that perfect two-syllable word to complete my Haiku. And if you're not sure how to type something, it will even offer spelling suggestions as you type. Brilliant.



K-9 Mail

Free | Lixam Ltd | tinyurl.com/amnngzb

The hugely popular alternative open-source mail client for Android, K-9 Mail, has been released for BB10. K-9 Mail supports IMAP, POP3 and Exchange 2003/2007 (with WebDAV), and can provide you with a handy way to have a less important email address (like the one that receives all those daily deals emails) available on your handset, without having to integrate it into your Hub. It also supports search, IMAP push email, multiple-folder sync, flagging, filing, signatures, bcc-self, PGP, mail on SD and more.



BeJoose

\$1 | The Jared Company
| tinyurl.com/amy5f42

BeJoose is a memory optimiser for your handset that will keep your RAM usage trim and tight, reducing CPU loads and thus improving your battery life. In addition, it can also help with the stability of your phone, with some users claiming it helped them avoid the daily battery pull. Since the claims on improved battery life will differ from device to device, the dev includes a money-back guarantee, so you can be safe in the knowledge that your dollar won't be wasted.

BeJoose - Memory Status	
RAM Allocated:	12606 KB
RAM Free:	18778 KB
Total RAM:	31384 KB
FLASH Allocated:	86520 KB
FLASH Free:	52828 KB
Total FLASH:	139348 KB
BeJoose is started automatically everytime you reboot! BeJoose is Active In Background!	

DoomGLes for PlayBook

No platform is complete without this port.

\$2 | Michael Ryssen | tinyurl.com/beymrpn

It's a sort of rite of passage for a platform to gain a DOOM port and now the PlayBook can claim that most important milestone.

Of course, just because just about every platform for the last 20 years has had this ported to it (my MP3 player included), doesn't make it any less fun to play. The 7in screen of the PlayBook is also a marked improvement over the 2.5in screen of my iPod.

The port uses an updated version of the original DOOM engine that's based on OpenGL for Embedded System. As such, it brings with it a few improvements over the original including a higher resolution to suit the PlayBook's screen, real-time dynamic lighting effects, particle effect upgrades, 3D monsters and objects, blood projections when enemies are wounded and more realistic water effects.

The version distributed through BlackBerry World includes the shareware version of the game as it's legally distributable, but if you



have the DOOM 1, Ultimate or DOOM 2 WAD files (the compressed files that contain the actual game), you can easily replace the

included shareware version on your PlayBook by following the instructions here: tinyurl.com/begywzv. [BTT](#)

FEATURE

NEW LIFE FOR OLD TECH

Don't let your old hardware fade away — use it to fill gaps in your tech arsenal. **Darren Yates** shows you how.





How much computer hardware do you have lying around, gathering dust, holding up tables or simply rusting where you left it? If you're anything like me, you'll have old working laptops, desktops or even tablets gathering dust. And it's such a waste because while these devices may no longer be frontline hardware, with just a little effort they can be revived to perform very useful tasks.

LAPTOPS ARE GOLD

Nothing spells wasted opportunity like a working laptop sitting on a shelf. Laptops are absolute gold – they're low-power devices, which means 24-hour operation won't cost you a bomb; they're compact, so they're easily hidden; they're quiet, so they're useful for media use; and they have built-in battery backup, so they can be made to shut down gracefully. As we'll show you, even if you've only got a netbook lying around, there's plenty you can still do with it. The original Atom N270 netbooks still have the performance of a 2GHz Pentium 4 desktop, so don't underestimate what they can do. If you've got a dual-core notebook, even better – basic media streaming could well be a possibility, gaming servers, your own Dropbox clone, the list goes on. There are boatloads of opportunities for turning a laptop into a useful companion device.

DESKTOP PERFORMERS

I always advocate not bothering to upgrade a computer when it's no longer the current CPU socket type. The cost of ripping out motherboards and components means you may as well start from scratch, with the bonus that you'll still have your original working computer at the end of it. And here's where you get that return – many of us will now have old dual-core desktops lying around, no longer used as our primary computers, but still having plenty of speed nonetheless.

Thanks to the longevity of Windows XP and PCI expansion slots, there's still enough currency in these systems to press them into back room roles. They'll cost more to run than laptops of a similar vintage, although you'll generally have more speed to play with, too, which opens up plenty of ideas you can try.

OLD SMARTPHONES & TABLETS?

We're getting to the stage where smartphones and tablets are beginning to take up residence in the tech graveyard. I've got an old, cheap \$75 7in tablet I bought off eBay a while ago that still works, along with a smallish HTC Wildfire S smartphone. They're no longer my main portable devices, but apart from anything else, these are compact computers that are still up for some decent server roles, using as little electricity as a compact fluorescent lamp. Wi-Fi alone makes these devices well worth rejuvenating, yet add in Google Play, possibly Bluetooth, a camera and storage, and there's a lot more life left in these devices, even if they're too old, small or slow compared with what you're using now.

WHAT WE'LL COVER

This month, we'll show you how to bring your old tech gear back to life with a few examples, as well as explain how to physically check your gear is up to scratch for a return to work. Best of all, much of what we look at shouldn't cost you anything except a bit of time.

Thanks to the amazing longevity of Microsoft's Windows XP operating system, even your old desktop computer hasn't yet hit its point of no return. There are squillions of apps that will still run on old hardware because of this decade-plus-old OS.

So pull it down off the shelf, dust it off and crank it up – there's still life in that old gear yet!

THE DESKTOP MEDIA STREAMER

Got a library of videos that won't play on your iPhone or iPad? Reboot your old PC into a free media streamer. **Darren Yates** shows you how.

The iPad might be the world's most popular tablet, but it's not brilliant when it comes to offering wide built-in support for different audio and video codecs. You can watch any video you like on an iPad, as long as it's encoded using the H.264 video codec. Google's Android OS is similarly hamstrung as far as hardware-accelerated decoding goes, but it's helped out by a raft of software-based codecs. However, the problem with these codecs is that they rely on the device's CPU to go the hard yards, which is a considerably more difficult job than doing it on a dedicated hardware decoder.

For battery-efficient performance, video files played on your portable device from network storage should be in H.264 format. That's fine, if yours are; not so crash-hot if they're not. But rather than sitting at your computer re-encoding everything, what about doing an on-the-fly transcode from a video clip's original format into H.264 just as the data is sent to your portable device? That's what media streaming servers do. It's the difference between what I call passive and active streaming: a basic file server passively streams files to your device, whereas a media streaming server actively transcodes the video into the format you need as you need it.

SERVER APPS

Two of the best media streaming server apps are Air Video and Plex. Air Video Server comes in Windows and Mac OS X versions, with only an iOS client, whereas Plex supports Windows, Mac OS X and Linux on the server side, and has clients for Android, iOS and a newly minted release for Windows 8 and RT. These two include live transcoding functionality to convert any video into the required H.264 format. Both Plex and Air Video need Apple's Bonjour printer service, and Air Video also needs the Java Runtime Environment (JRE) download from tinyurl.com/caxq946. You can grab Bonjour from tinyurl.com/y1hk6tf (if you have iTunes installed, you already have Bonjour).

ENCODING QUALITY

Whichever way you decide to go, the most important task is setting the video quality. You do this on the Air Video and Plex client apps, but the bigger picture here is defining how to get the best results based on your desktop server.

Working with phones and tablets means Plex and Air Video have to transcode your video library into H.264 format. Since H.264 is about the most complex video codec to process (aside from the new H.265), it requires proportionally more CPU speed than, say, MPEG-2 or DivX, and more again the larger the video frame size. If your desktop server can't keep up with the transcoding process, it'll drop frames and your videos will freeze during play. So you want the quality high enough to be worth watching, yet not too high that the server can't keep up.

HOW OLD A DESKTOP CAN I USE?

Air Video partially solves this by limiting the transcoded video size to a maximum of 1,280 x 720 pixels, which helps since there are fewer pixels to encode. Technically, that's a drawback when you've got 1080p video



The iPad is a great tablet, but it's not so hot for video codec support.

to play with, as it limits the video resolution and overall video quality. However, it actually suits the use of older hardware for the job. To prove it, we found that a 2008-vintage dual-core 3GHz Core 2 Duo E8400 desktop running Windows 7 had no trouble transcoding 1080p H.264 video into 720p H.264 with Air Video. Plex also succeeded in transcoding the same clip into a lower bit rate 1080p H.264 format.

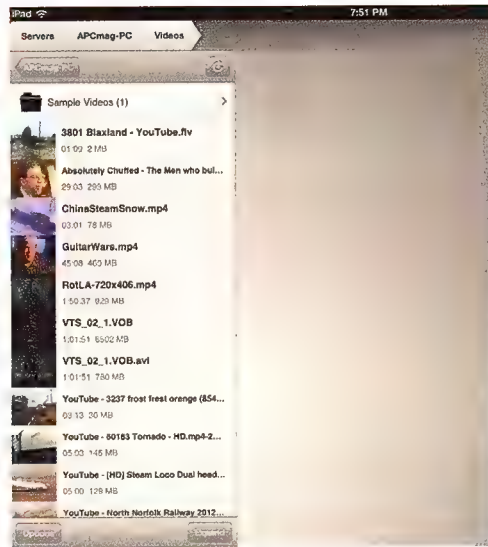
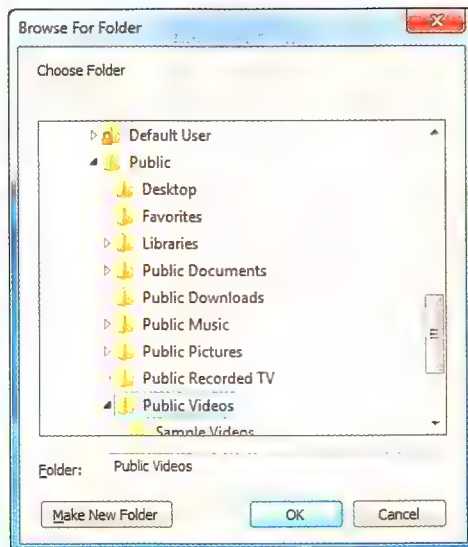
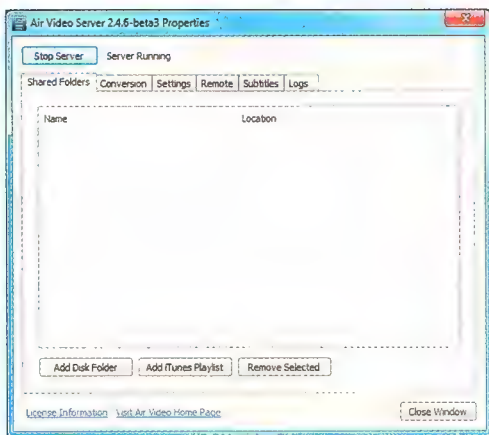
Air Video has a second option for 'Conversion Only', which converts the file into H.264 without streaming it. To play it, tap that file again, although you'll have to wait until the initial transcode is finished – something that may take all day with a Pentium 4 desktop.

The bottom line is, the older the desktop you plan to revive, the lower the video resolution you have to work with. So don't expect a single-core Pentium 4 desktop to handle transcoding 1080p Blu-ray discs into 720p H.264 – it just won't happen. At least not on the fly.

TRANSCODING FROM H.264

It might sound weird to transcode H.264 video into H.264 video, but there's a good reason to do it. H.264 comes in several profiles, each adding new complexities to the encoding process to improve video

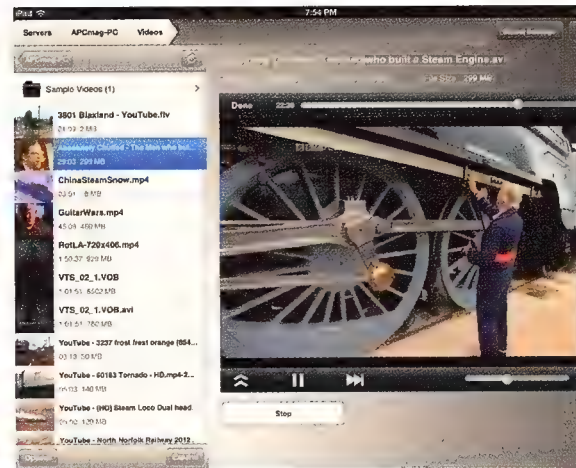
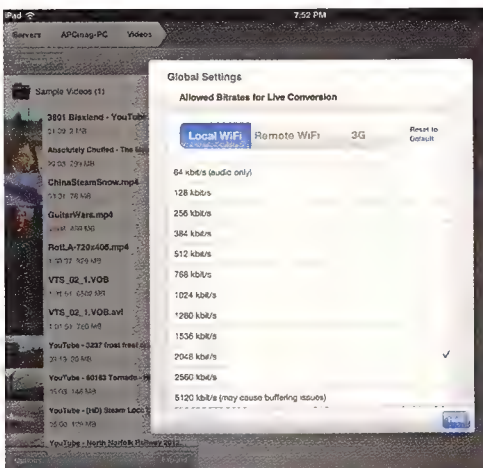
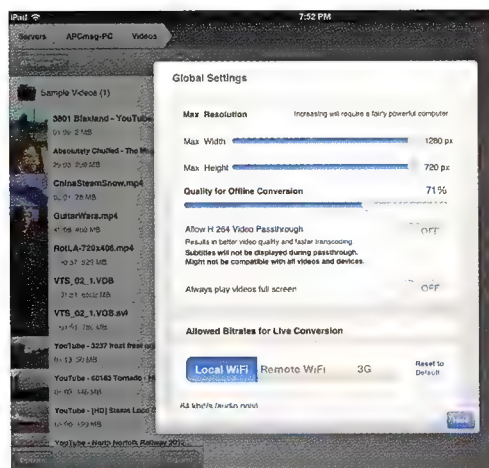
WATCH VIDEOS ON YOUR IPAD



01 Install Air Video Server from tinyurl.com/icnnos. You also need Java Runtime Environment (tinyurl.com/caxq946) and Apple's Bonjour service (tinyurl.com/yhk6tf) if you don't have iTunes. Install these last two first. Launch Air Video Server by right-clicking on the system tray icon and selecting 'Show Settings'.

02 Click on the 'Shared Folders' tab and then the 'Add Disk Folder' button. Locate the folder containing your video files and click the 'OK' button. You're now done with the server and it's ready to roll.

03 Fire up your iPhone or iPad and install Air Video Free from the App Store. Tap the '+' button and locate your server from the 'Computers on local network' list. Tap the 'Videos' entry and you'll see a list of video files (you'll only see the first three with the free version, but the full version shows all of them).



04 Before you begin playback, click on the 'Global Settings' button at the top-right of the screen. Make any adjustments to the 'Max. Width' and 'Max. Height' settings as you wish. These will set the maximum resolution videos are transcoded to.

05 Scroll down to the 'Allowed Bitrates for Live Conversion' settings and with the 'Local WiFi' tab selected, tap the '2048 kbit/s' entry. When you're done, press the 'Hide' button at the bottom.

06 Tap on a video, press the 'Play with Live Conversion' button and within a few seconds it should begin playing. Tap the video screen and in the bottom-right corner, click the 'Full Screen' toggle button to send the video to the full iPad screen size. Enjoy the show.

quality: those profiles are Baseline, Main and High. While the iPad 2 and onwards can handle High Profile H.264, the original version can't and neither can Android devices. Check Google's Android developer web site (tinyurl.com/rydapp) and it specifies Baseline Profile H.264, among its other VP8 and MPEG-4 options.

However, there's also a limit on the video bit rate with older devices, so if you have a Blu-ray movie rip with its 30Mbps bit rate, don't expect your Android phone or tablet to handle it too well if you feed it straight in. That's where transcoding makes the difference. Dropping that bit rate

down to around 2.5Mbps will give you good quality on your portable device without drowning it in video data.

GIVE IT A TRY

If you have an iPad or iPhone, Air Video is a simple way to stream video. Even with a half-decent dual-core desktop revived from your tech graveyard, there's enough horsepower to stream any video file into the right iOS format. This should also work if you have an old dual-core laptop. Best of all, Air Video Free can do it all for nothing.

THE NETBOOK HOME SERVER

It's time to pull out that old notebook and crank it up into a zero-cost home server. **Darren Yates** shows you how.

I love my old netbook. Well, I used to before it got so slow. Actually, it was never that quick to begin with. With the federal government handing out netbooks like party favours to school kids for the last few years, chances are there are thousands of them holding up tables and clogging up shelves around the country by now.

While a netbook – or any 2008 or earlier vintage notebook – won't be up for video editing with Adobe Premiere, there's still plenty a compact computer can do, including running as a home server.

BENEFITS

Sure, you wouldn't use this as your only form of file backup, but for a compact home-wide source of communal storage for music, movies and general files, a 1.6GHz Intel Atom N270-powered netbook isn't the silly idea it might sound like.

The majority of netbooks came with Wi-Fi – at least 802.11g, but many have 802.11n – and a few with Bluetooth as well. So you've got the makings of not only a wireless server, but with Bluetooth, you can use it to stream music to a Bluetooth music adapter or Bluetooth speakers.

If the netbook's battery still works, you've also got battery backup – if ever the mains power blacks out, the battery takes over. We developed an exclusive APC app last year that automated a graceful shutdown when the switch from mains to battery power was detected. You can grab it from tinyurl.com/6pew3ew.

Unlike a desktop PC of that vintage, a netbook consumes only around 10W of power, so it'll be much cheaper to run 24 hours a day. Throw in USB ports and you've got options to attach external storage. So a netbook actually punches well above its weight for functional versatility.

WHAT YOU CAN DO

These days, many NAS boxes have similar levels of CPU hardware as your average netbook, so it stands to reason a netbook would be able to do a similar role to a NAS box when provided with the right software.

- **File serving.** This is a snap for any netbook and only requires your Windows XP (or 7) operating system.
- **DLNA server.** Grab Windows Media Player (WMP) 11 and you can serve WMV/AVI files to your smart TV, media player or smartphone.
- **BitTorrent downloader.** Download your content straight to your server using any of the myriad torrent clients available. We like the slim µTorrent for a netbook server.
- **External storage.** You can plug in external hard drives and USB flash drives, share them in Windows Explorer and expand your netbook server storage easily.

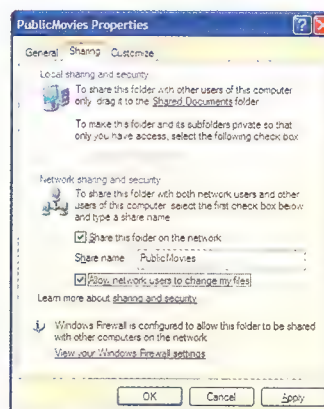
SETUP: FILE SERVING

Before you get cracking, make sure you read the 'Old tech tune-up' story on page 74 to ensure your tech doesn't go all zombie on you. Once that's done, create a series of shared files on the notebook's largest partition; a top-layer 'PublicFolders' folder with 'PublicMovies', 'PublicMusic' and

SHARING FOLDERS

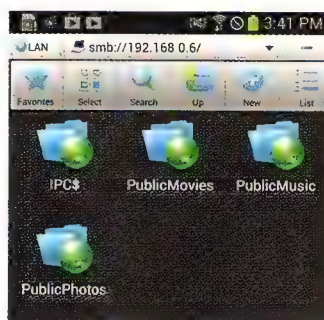
01 SHARE ON A NETWORK

Right-click each folder you wish to share in turn, select 'Sharing and Security' and tick the boxes for 'Share this folder on a network' and 'Allow network users to change my files'. Click 'Apply' and then 'OK'.



02 ACCESS THE FOLDERS

Provided the netbook server is connected to the network, your other client devices should see the server and be able to access these folders, but no others (unless you've shared them). Do a couple of test writes and reads, and it should be fine.



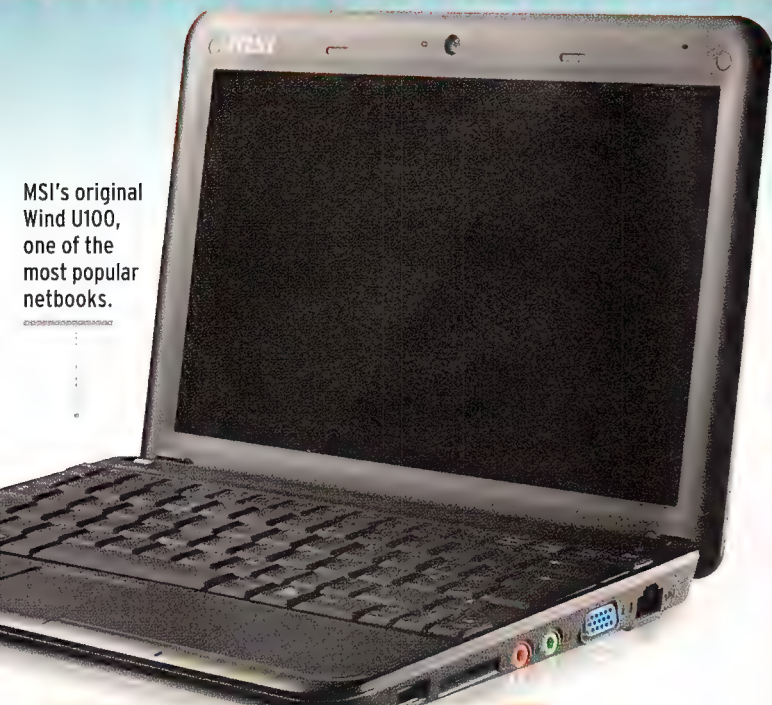
'PublicPhotos' subfolders is as good as anything else. The last step is to share these folders so they can be seen by other devices on your home network. If you add in external storage, the above step-by-step guide will work for that as well.

SETUP: DLNA SERVER

A DLNA/UPnP server is really just an app and protocol that makes it easier for appliance-style tech, such as smart TVs and games consoles, to look up your shared content. However, compared with direct share access, DLNA's codec support is limited. For example, WMP11 can only handle WMV and AVI files.

If you have a good network media player connected to your TV, use its 'network shares' option rather than the 'DLNA server' feature and you'll have far broader codec support. That's because the media player does the work directly and the netbook server becomes just a file server.

MSI's original Wind U100, one of the most popular netbooks.



APC's ServerPowerTimer app auto-initiates a power-down cycle when power switches to battery.

This is especially the case if you want your netbook server to handle 1080p video files. Using DLNA may not work if the server wants to transcode the file, but if you're just file serving, a 1080p video file with a total audio/video bit rate of under 25Mbps should be fine. The limitation is basically the netbook's data transfer capabilities, much less its CPU performance. Using the typical sub-250GB 2.5in hard drive, you'll get around 4-5MB/s at best over a wireless connection.

To set up WMP11 as your DLNA server, you have to do two things: get WMP11 to locate your media content and add it to the library, and allow your DLNA device to access that library.

SETUP: BITTORRENT DOWNLOADING

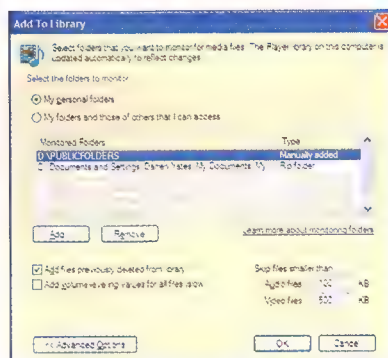
Using a netbook server as your torrent downloading device makes sense – it uses less power and makes less noise than a desktop, so you can leave it on overnight and not disturb your sleep or your wallet. If you're downloading video content, save it to its own folder rather than your 'PublicFolders' shared folders, as it's a smarter way to ensure your torrent content remains separate from other media content you have on your server. Just beware of toolbars wanting to install their way into your server when installing torrent clients (this is the case with µTorrent, unfortunately).

Use the client's scheduling tool and you'll be able to take advantage of your off-peak bandwidth if you're not on an all-you-can-eat internet plan. You access this by selecting 'Options' from the main menu and then 'Preferences > Scheduler'.

JUST A TASTE

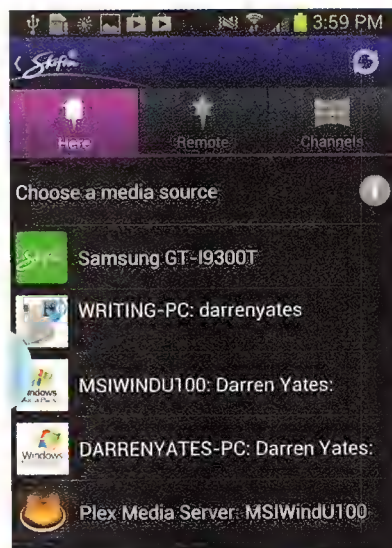
My rule of thumb for adding functionality to a netbook server is to look at what a QNAP or Synology consumer-grade NAS box can do and see how to replicate it on a netbook. Apart from RAID, many other features are just software implementations so if you can find the right app, you should be able to make your netbook server do pretty much the same thing.

WMP11 AS YOUR DLNA SERVER



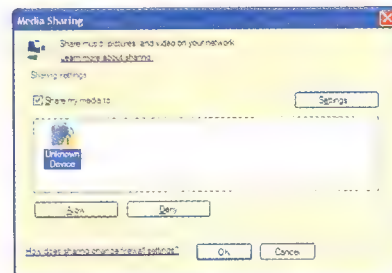
01 ADD TO LIBRARY

Fire up WMP11, click the 'Library' button and select 'Add to Library'. When the 'Add to Library' window appears, tick the 'My Personal Folders' button, click the 'Add' button under the list table and add in your 'PublicFolders' top-layer folder. Click the 'OK' button twice and WMP11 will automatically start loading your content into the library.



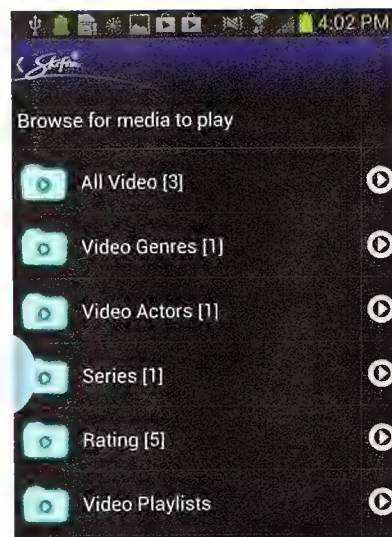
02 CONNECT YOUR DEVICE

WMP11 won't automatically allow just any DLNA device to access your library, so fire up your DLNA device (TV or smartphone, for example) and point it to your netbook server. It'll appear as the server name, followed by the username of the current account; in our case, 'MSIWINDU100: Darren Yates'.



03 ALLOW SHARING

Head to the netbook server and you should get a pop-up library sharing request notification. If not, check the system tray for a WMP11 icon. Left-click and the notification should appear. Most devices will be named. Click the device, click the 'Allow' button and then 'OK'.



04 NAVIGATE AND PLAY!

Go back to your DLNA client and you should now be able to navigate through your shared folders and play supported content. **ETC**

YOUR OWN MINECRAFT SERVER

Gaming servers on old hardware? You bet! **Darren Yates** shows you how to create your own *Minecraft* server.

While recent updates to *Minecraft* mean you can now enjoy a game with friends with the new 'Open to LAN' option, it can be more convenient to run your own *Minecraft* server. This allows you to play the game from various computers on your local network. Fittingly, it's something you can dig up your old tech for.

WHAT YOU NEED

Minecraft is one of the easier games to server up. You just need the *Minecraft* server app plus the latest Java Runtime Environment (JRE). What's cool about the game from a server viewpoint is that its requirements are relatively modest – even for up to 15 or so clients, you only need a dual-core CPU system. Use Windows XP with just a couple of friends and you can probably even drag that old Pentium 4 crate out of the garage and crank it up.

What a *Minecraft* server does need is RAM – at least 1GB for the server app on a Windows XP system and 2GB on a Windows Vista or 7 server. And that's over and above what's needed for the operating system. So, assume at least 2GB of RAM for a Windows XP box and 4GB if you're running Vista or 7. The more RAM you have, the more game files can be stored in memory, which will help lag times. But unless you open up your LAN party to Facebook, you shouldn't need more than a Pentium dual-core server with 4GB of RAM, regardless of the OS.

INSTALLING THE SERVER

Installing the server is easy. First, grab the latest JRE install from tinyurl.com/caxq946. Grab the version that's right for your operating system (32 or 64-bit). Next, download the *Minecraft* Server app from minecraft.net/download. Like the game, the free server app is a standalone executable so there's no installer. The first time you run it, it also creates the necessary 'world' subfolders, along with whitelist files and more. So before you run it, create a 'Minecraft_server' folder somewhere on your server (allow up to 10GB of storage) and copy the executable to the folder before you launch it. If you're running Windows Vista or 7, you'll also be asked to allow it through the OS's firewall. Click 'Yes' or 'Allow' so that your other game client systems will be able to access it.

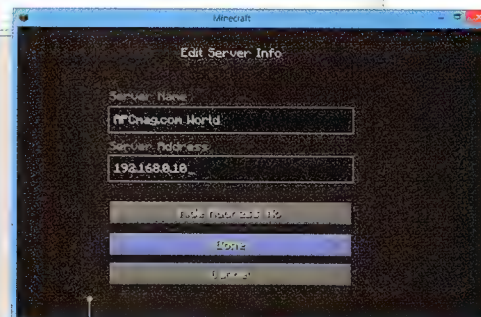
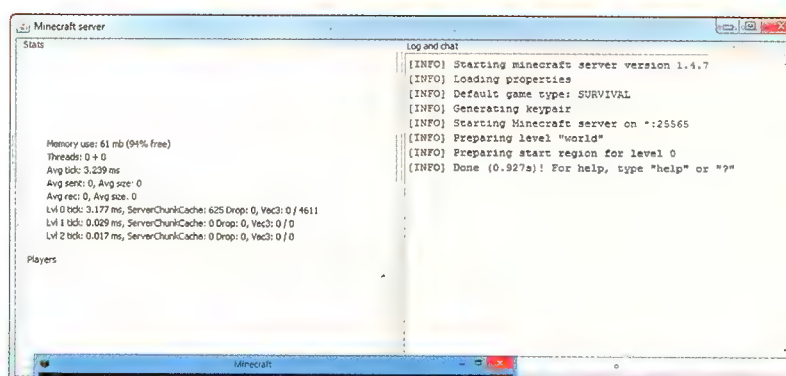
In order to make use of more than the base 100MB RAM setting, you need to alter the server launch command, so try this:

```
java -Xms1024M -Xmx1024M -jar "c:\your Minecraft folder\
Minecraft_server.exe"
```

This will bump up the RAM allocation to 1GB, so make sure you've got at least 2GB in your system. And yes, you need those capital letters. Just change the folder name to whatever you used.

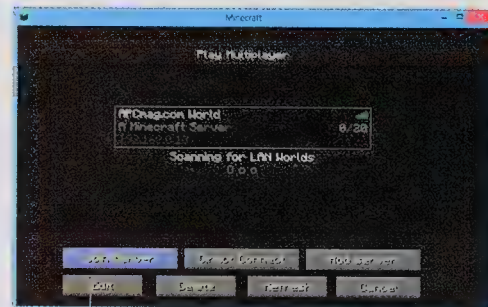
ACCESSING IT FROM YOUR CLIENT

Next, you'll want to access it from your game client. Launch the game executable and select 'multiplayer' from the front menu. Choose 'Add Server', type in the IP address of the game server and click 'Done'.



Check 'memory use' to see if your RAM set command launch has worked.

You can use whatever server name you like, as long as the IP address is correct.



Click the server entry, press 'Join Server' and you're away.

(On Windows you can find the IP address by running `ipconfig` at a command prompt and retrieving the IPv4 address.) All other LAN clients use this to connect to your server and game world.

When the 'Play Multiplayer' screen reappears, your new server should be listed. Click on it, click 'Join Server' and away you go.

Minecraft is a game well suited to old hardware – even the game client's requirements are a Pentium D or Athlon 64 CPU and GeForce 6000-series/ATI Radeon 9000-series graphics card. So, go ahead – dig up your old tech and turn it into your own *Minecraft* server.

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YOUR TABLET MICRO-SERVER

Get that old tablet out of your tech junkbox and turn it into a portable micro-server. **Darren Yates** shows how with free software.

It's amazing how quickly smartphones and tablets can hit the tech graveyard these days, but in comparison with PCs, these portable devices are in their infancy. So it shouldn't surprise us that we're seeing a rapid churning of new models with faster chips, relegating last year's models to the scrap heap.

The cheap \$75 Android 4.0 tablet I bought off eBay last year is my 'Exhibit A' – it still works. With a few judicious app installs, you can turn cheap tablets like this into neat little wireless micro-servers. Sure, the 32GB internal storage limit means it's not a long-term option, but it's still enough to make a usable server out of one.

Not only that, the boom in Android app development means you can mimic a number of NAS-like applications including a BitTorrent downloader, UPnP/DLNA server and shared folder storage with password protection. In fact, many of the server applications you can do on a laptop, you can also do on an older tablet. For example, one of these is still fast enough to serve up your 1080p video files if the total bit rate is under 25Mbps.

The big benefit, however, is the incredibly low power cost – with most single-core ARM tablets using as little as 5W of power, you'll barely notice this on your next quarterly power bill.

APPS YOU NEED

For basic file serving, you'll need the Samba Filesharing app. It's easy to use and works with Android 2.0.1 and up. The only drawback is it needs root access on your tablet, although most budget eBay-sourced tablets are already rooted so it shouldn't be a problem.

BubbleUPnP is a full-on DLNA media server that works with any Android 2.2 or later device. If you have a DLNA-enabled TV with wireless networking, there's a good chance you can play DVD-resolution movies from your tablet to your TV over the network.

BitTorrent does what your desktop or laptop Torrent client can do, except it downloads torrents straight to your tablet. You can also set the upload/download speeds so they don't take over your internet connection.

We'd also throw ES File Explorer into the mix simply because we love it.

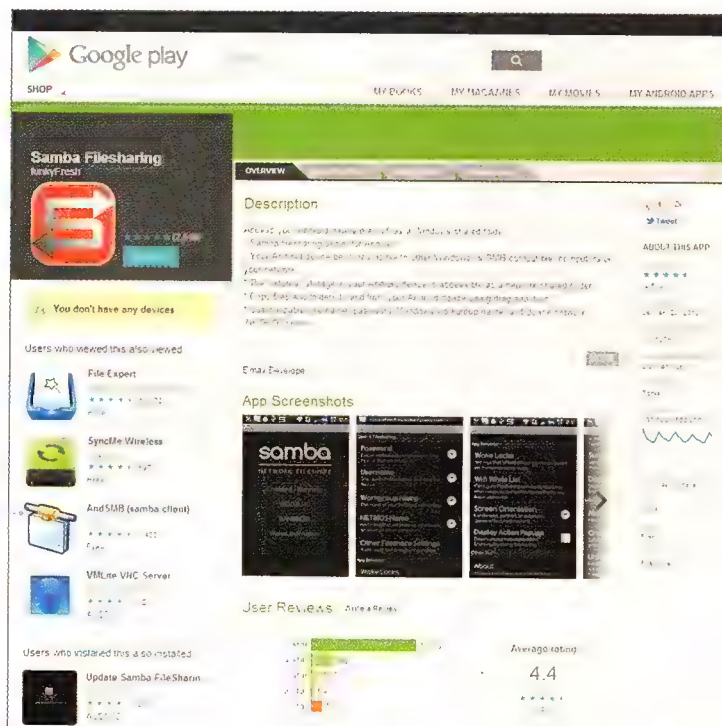
GIVE IT A TRY

There's no point in having idle tech, so if you've got an old tablet sitting in your junkbox that's doing nothing, whip it out and give it something useful to do.

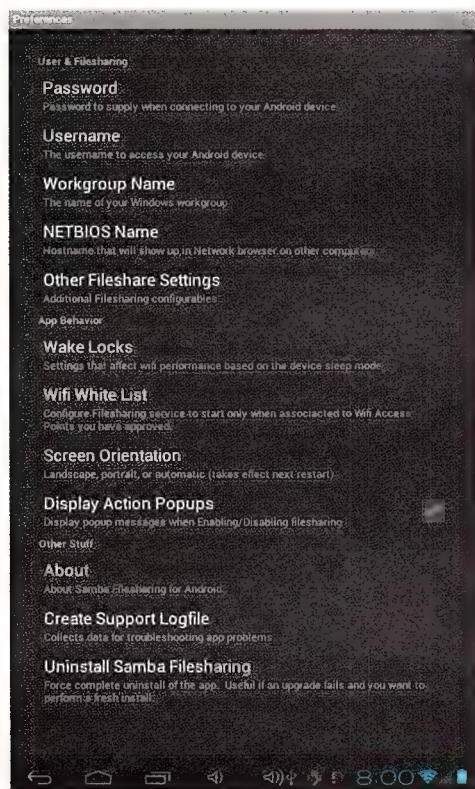
The Samba Filesharing app turns your tablet into a micro-server.



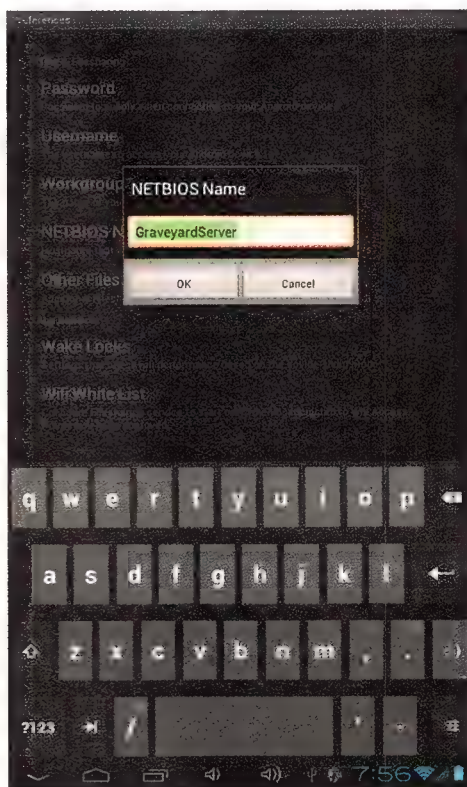
Give your old tablet something useful to do.



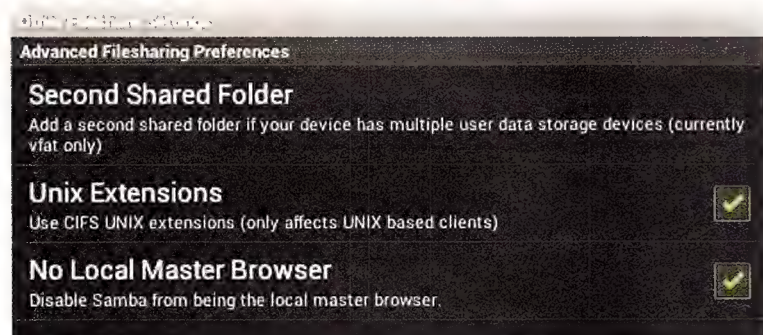
TURN YOUR TABLET INTO A MICRO-SERVER



01 Grab Samba Filesharing from Google Play and install it. Tap the 'Menu' button and then 'Settings' to bring up the 'Preferences' screen.



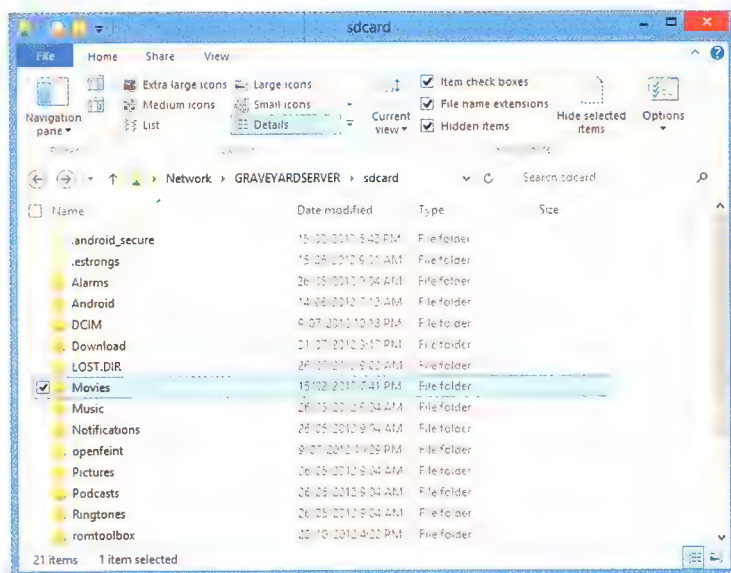
02 Tap 'Password' and type in the password other users will need to access your micro-server. Do the same for 'Username' and 'NETBIOS Name' (the name of the server that will appear on your client devices). Leave the workgroup name as the default 'Workgroup' unless you've changed it on your network. Press the 'back' button when you're done.



03 To use your external microSD card as secondary storage, go to 'Settings' and tap 'Other Filesharing Settings'. Choose 'Second shared folder' and select your microSD card. Press the 'back' button to get back to the main screen.



04 On that front screen, tap the big Samba logo – it's a toggle button that turns the server on and off. Within a few seconds it'll notify you that it's up and running.



05 Head to a network client and you should now be able to see the server in your file manager. Access your new server's storage, do a couple of test reads and writes, and you're good to go.

OLD TECH TUNE-UP

Just like an old car, your old hardware will need some love before you can turn it loose. **Darren Yates** explains.

Chances are, most of us have the odd desktop or laptop (or two) rotting away in our 'tech graveyard'. It may have carked it from a hard drive failure or a lost power supply unit. It may also simply have been the victim of an overzealous upgrade or just been replaced by something newer. If you have a working computer, a little bit of TLC may be all that's needed to get it back on deck.

FIRST THINGS

The first thing to do is check that you still have all the parts, including the power brick for laptops. Check nothing seems broken (it's funny how time can cause all sorts of dings and dents). After that, if you're using a desktop, pull the cover off. Dust isn't a friend to a CPU cooler or PSU fan and any accumulation will be affecting thermal performance. So, do an internal inspection, clean case surfaces with a slightly moist (if it feels wet, it's too wet) cloth and use canned compressed air to remove dust from motherboards and expansion cards.

Tech gear that's been left unused for at least a year should always be inspected before turning it on the first time, just so you don't get any nasty surprises.

RECOVERY DISCS

For at least the last five years or so, we've seen the death of recovery media. First, it was the Windows installation disc, which gave way to system-specific recovery discs and finally, recovery partitions on the hard drive itself.

If you haven't yet created recovery discs from that recovery partition, pardon my directness, but **DO IT RIGHT NOW!** If your hard drive fails, it's unlikely your system provider will still have them available, so make a copy of the partition and create those recovery discs before it's too late. You probably won't need them, but regardless, you can't use what you don't back up.

UPDATING

Once you get that first boot out of the way, you've got your recovery discs and you're quietly sitting on the Windows desktop, it's time to do some OS and software maintenance. The first thing to do is make sure your OS is up to date.

You may have several updates to install, so a Service Pack might even be needed. If so, the simplest way is to grab the Service Pack as a single file and install it in one hit. However, you should still run Windows Update afterwards to make sure you get everything after that Service Pack was released. Windows Update itself may also need an update and you may even need Microsoft .NET Framework 3.5 (or 4), so install that, too.

After that, look for driver updates for your motherboard, graphics card and other peripherals. These will very likely help to improve performance as well as catch bugs and problems. Windows XP SP3 is a minimum requirement for many apps, so having your system at least up to spec with the latest drivers and updates will make a huge difference.



Nothing speaks of health and life like clean CPU fan blades.

This is my old Compaq CQ43 laptop, before I replaced it.



ALTERNATIVES TO WINDOWS

If you've lost your recovery media and your installation discs, and just have the computer itself, a zero-cost option is Linux. Many of the better Linux distros, such as Linux Mint and Xubuntu, come with kernels chock-full of driver additions to handle a wide array of laptops and desktops. If you've never used Linux before, here's your chance. Head to xubuntu.org and grab a basic CD ISO image.

There's no doubt a little maintenance now will help ensure you don't have a zombie computer on the loose later on. **BTDC**

LATEST SERVICE PACKS

Grab the latest Windows Service Pack standalone installers for free from Microsoft and speed up the process of getting your system back up to speed.

- Windows XP SP3 - tinyurl.com/cbpbmf6
- Windows Vista SP2 - tinyurl.com/a763hzu
- Windows 7 SP1 - tinyurl.com/c329lrs

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Experts solve your computing problems

APC and its readers can be one giant helpdesk. If you have a technical problem, chances are one of us can solve it.

WINDOWS

WINDOWS 8 WITHOUT TOUCH

Q I am getting ready to put together a new PC – the first in a very long time. My current box is a Pentium 4 in a Socket 478 motherboard running Windows XP Pro. Should I install Windows 7 or 8? I don't need or want a touchscreen, so does Windows 8 work well without one?

Robert Weber

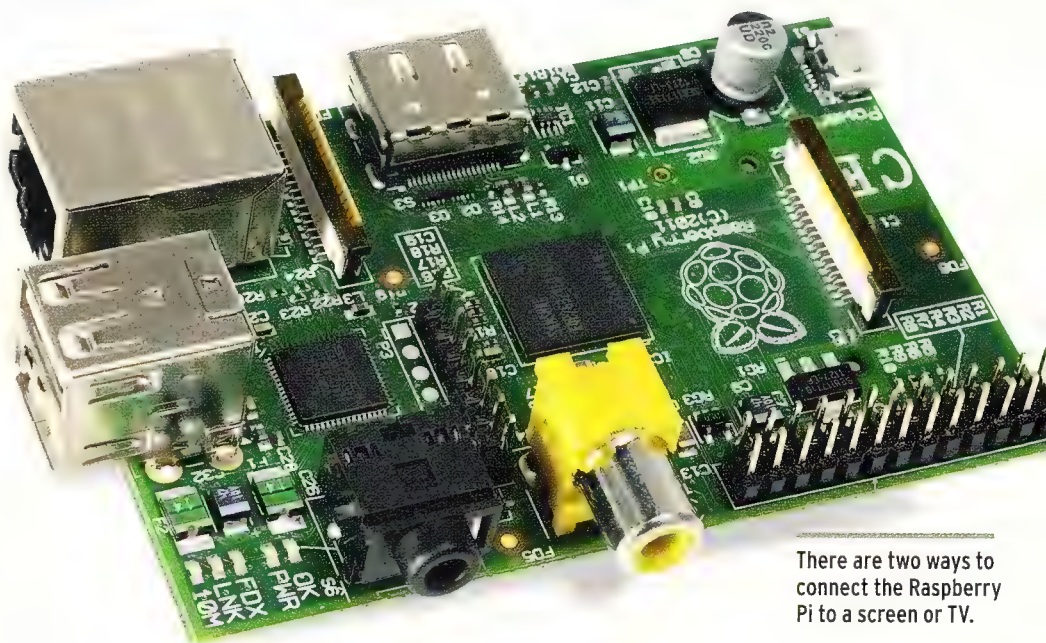
A Windows 8 works fine without a touchscreen. It's our opinion that a new Windows 8 laptop should have a touchscreen, but a desktop doesn't need one. On a desktop, your hands are much farther from the screen, so the reach-up-and-swipe motion that works fine on a laptop doesn't work as well on a desktop.

As for which OS to use, we have to recommend Windows 8. It's slightly faster than Windows 7 on the same hardware and if you end up hating the Modern UI, you can always avoid it and spend most of your time in the desktop or in extreme cases, you can use software like Classic Shell (free from www.classicshell.net) to disable it entirely. In our opinion, the 'Start' screen is fine if you use it as a 'Start' menu and annoying if you try to use it for anything else.

GRAPHICS CARD

BAD POOL HEADER

Q I recently built a PC from scratch and asked a friend of mine to assemble it. I then bought a cheap graphics card just to play the basic games I wanted. Not long after that I got a blue screen of death error called 'bad_pool_header'. I went on the internet and



There are two ways to connect the Raspberry Pi to a screen or TV.

saw that it could be a component that's faulty. So I started with the RAM modules and found out it was the first slot of my first set of dual-channel RAM slots. So I used the second set of dual-channel slots instead. But yesterday I received another blue screen of death error called 'memory_management', I think. When it started up, it loaded the Windows loading screen, but after that I got a black screen and could only see the mouse pointer.

Cornelis Swanepoel

A 'Bad pool header' or 'Stop code 0x19' can be caused by faulty or improperly socketed RAM, but then so can almost every Windows error. If you're still getting the bug, it may be your RAM module that's faulty, rather than the socket. Or it might be nothing to do with the RAM at all. Windows Server 2003

used to have a bug in the NTFS filing system that caused this, for example (see knowledge base article 892260). And buggy drivers could also be to blame. So the first step is to try swapping the RAM for known good modules. Maybe do the assembling yourself this time, instead of trusting this friend.

HARDWARE

RASPBERRY PIPS

Q I bought a Raspberry Pi platform to help students in my class get access to a low-cost computer. When it arrived, I discovered to my amazement it can only be connected to an HDMI monitor. Where in South Africa will I be able to buy a low-cost HDMI monitor or is there another solution?

Nico Loubser

CONTACT@APCTEST.COM Share your tech tips

Have you solved a tech problem or found a better way of doing things with your computer? Share your information with other APC readers by sending it in as a tip to contact@apctest.com, together with your name

and contact details (details won't be printed). Alternatively, if you have a technical question post it online on our forums at apcmag.com/forums and other readers may be able to solve it.

A There are two video outputs on the Raspberry Pi. You'll get the sharpest image from the HDMI connector, provided you have a monitor that accepts a digital input. This doesn't have to be an HDMI monitor – a DVI one will work perfectly well with a cheap HDMI-to-DVI-D adapter cable. You can get these from most computer and electrical shops.

What you can't easily do is just connect to a VGA monitor. Some HDMI and DVI outputs send both the DVI-D and the analogue DVI-A signals through the same port (called DVI-I). This would make it very easy to use another cheap DVI-A-to-VGA adapter cable to convert the pin-outs, but the Raspberry Pi only outputs the DVI-D signal. Worse still, there's very little current supplied through the HDMI port, so if you attach one of the cheap DVI-D-to-VGA converters that draw power directly from the port, you'll risk blowing a diode on the Pi.

That only leaves a mains-powered VGA converter and they'll probably cost a bit more than a new monitor. Our perfunctory Googling suggests that www.comx-computers.co.za has bargain DVI monitors for around 800 ZAR (approximately \$90). Add another 50 ZAR or so for the adaptor cable and you should be good to go.

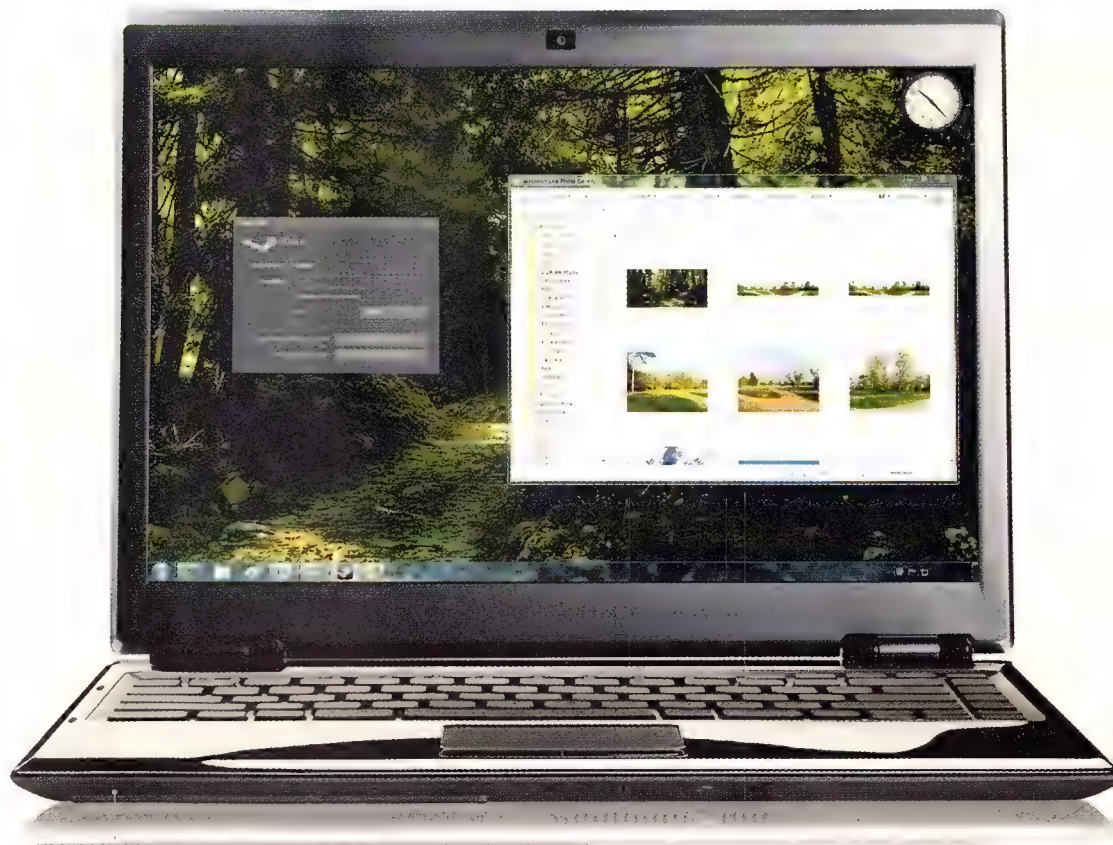
But wait, didn't I say there were two video outputs? Why yes. The other one is the yellow RCA connector on the other side of the Pi. This is an analogue composite signal. You can use that to connect to anything with a SCART connector, which basically means any TV. If you can't pinch the adapter plug from your Xbox, they're only about 40 ZAR. The image won't be quite so sharp or stable – analogue video never is – but your school probably already has a few televisions lying around, so it's potentially much cheaper.

HARDWARE

DID I BREAK MY BATTERY?

Q I bought myself a new laptop for Christmas and the manual says that I should have run it initially, with the battery power that came with it until it ran flat and then charged it for six hours. I didn't read this until it was too late and had plugged it in to charge overnight. Have I damaged the battery somehow?

Michaela Laidlaw



Laptop batteries aren't quite as precious as you've been told.

A No, it's just one of those fussy instructions that theoretically make a tiny bit of difference, but in practice don't really matter. Like 'store in a cool, dark place' or 'ensure the radiation shield is in place before igniting the nuclear engine'. Lithium batteries don't like being left either fully charged or fully discharged for long periods. They're normally charged to between 40% and 75% at the factory so they don't degrade sitting on the warehouse shelf.

The instructions in your manual are just for the battery monitor software's benefit because it's easier for the software to calibrate the battery meter if it can begin from a known state. It will automatically refine its accuracy over the first few charge/discharge cycles, though, so there's no harm done.

STORAGE

THE SHRINKING THUMB DRIVE

Q I recently bought a new 16GB USB drive. This came preformatted with FAT32 and had 14.8GB free. Thinking that this was probably due to some bundled bloatware or something, I reformatted it and in the process

switched to NTFS as we're supposed to nowadays. To my dismay the free space actually dropped to 14.7GB. Where has my extra 100MB gone? Where has the other 1.2GB gone as well?

Martin Holbrook

A 16 billion bytes (using the decimal gigabyte typically used by storage manufacturers because it sounds bigger) is actually just over 14.9 binary gigabytes (14.9 x 1,024 x 1,024 x 1,024). So that's most of your missing space accounted for – it's just a difference in the units used, like the difference between US and imperial gallons. The rest is the overhead consumed by the filing systems for the file allocation table (FAT32) or the master file table (NTFS).

NTFS is a more sophisticated filing system developed with bigger disks in mind, so it stores more metadata and you get slightly less left over for your data. You aren't 'supposed' to use NTFS, exactly. It's definitely better for hard disks, but Microsoft actually recommends exFAT for thumb drives. This is a streamlined filing system like FAT32, but it doesn't suffer from the same file and volume size limitations. bit.ly/18TtC

Tweak your network card

Squeeze a little more performance out of your network card with these simple tips from **Ashton Mills**.

YOU'LL NEED THIS

UPDATED DRIVER

You'll need to update the driver for your NIC, otherwise it will use the default Windows one, which won't have all the available settings.

There are many components to tweak in your average PC, but the humble network card (also known as the Ethernet controller or NIC, a.k.a. network interface controller) is often overlooked. For the most part this is because it just works and the defaults suffice for the most common usage scenarios. But many controllers feature options that may provide a benefit, especially if online gaming and lower latencies are a priority.

Before we begin, it's worth noting the following features and options can be dependent on the make and model. For example, the settings for an Intel NIC can be different for those of a Realtek NIC. Additionally, a feature may be present in both, but be called a slightly different name. The only way to find out is to explore, which is the fun part!

INSTALL THE LATEST DRIVERS

Before you delve into the options for your NIC, first make sure you grab the latest drivers for it. This is important because unless you explicitly install drivers for your controller, it will be using the default Windows one for your card, which almost always only includes a subset of options.

To find out what make and model you have, fire up the 'Device Manager' (in the 'Control Panel' for Windows 7, or right-click in the lower-left corner in Windows 8), browse down to 'Network Adapters' and then look for the name of your network controller.

Next, head to the manufacturer's web site. Some of the more popular brands for desktop controllers are Intel (downloadcenter.intel.com), Realtek (www.realtek.com.tw/downloads), Marvell (www.marvell.com/support/downloads) and Broadcom (www.broadcom.com/support/ethernet_nic).

FLOW CONTROL

Flow Control, also known as Ethernet Flow Control 802.3x, is usually a good thing and by default, most NICs that support it will have it enabled. Its purpose is to help prevent dropped packets by communicating when incoming packets are overloading the NIC (the cause of which could be many things, including the PC's other hardware and operating system) and to request the sender slow down.

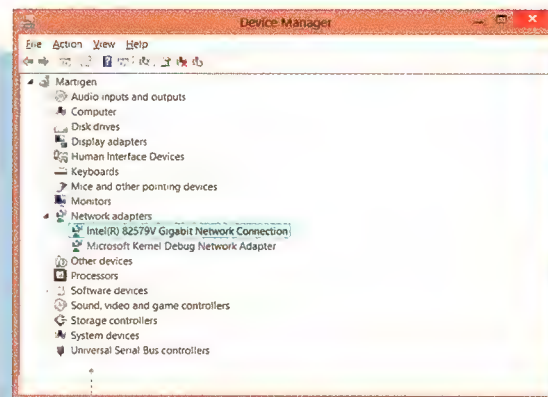
However, rather than improve performance, Flow Control has been known to reduce performance in mixed-speed networks (typically 10/100 and Gigabit) as well perform badly on cheaper routers and switches. In fact, for Flow Control to even work it must be supported by every client on the network, as well as any router or switch connecting them. Some argue that since TCP/IP includes its own flow control mechanisms itself, that NIC-based Flow Control isn't needed.

Flow Control is of most use on large, fast networks such as in the office rather than at home, and if online gaming is important. Where latency is a higher priority, disabling it may help. Also, Flow Control won't be honoured past your ADSL modem anyway.

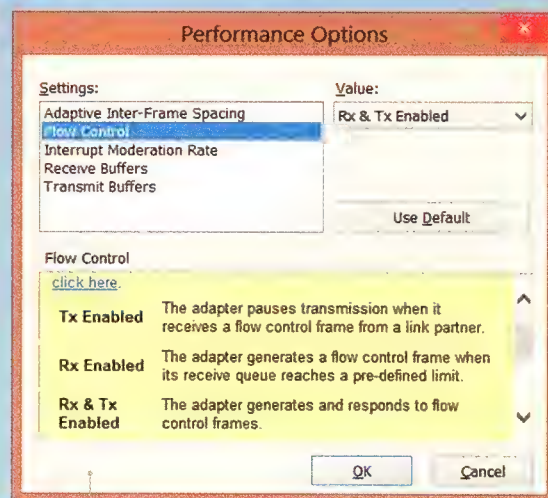
If gaming isn't a priority, but you do a lot of file transfers on your home network, try it enabled and disabled on all clients and see which works best for you.

INTERRUPT MODERATION

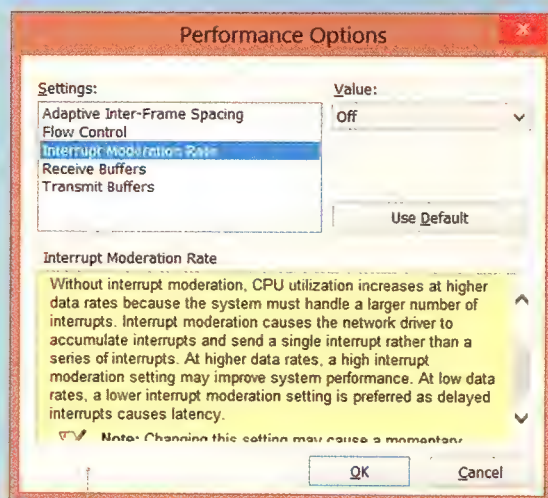
Interrupt moderation is a clever feature that, like various offloading mechanisms, NICs today support (such as TCP and



Find the make and model of the NIC.



Flow Control is less important for home networks.



Interrupt moderation is good for reducing CPU load, but at the cost of introducing latency.

UDP checksum) and is designed to reduce the load on your PC's CPU. Usually this is a good thing, especially on older computers with slower CPUs. It helps reduce processing load by coalescing multiple interrupts into a single intermittent interrupt on the NIC, rather than sending a constant stream (an interrupt is issued by a device when it wants the attention of the CPU). The faster the data rate of a transfer, the bigger effect interrupt moderation will have in reducing CPU load.

However, on slower transfers, interrupt moderation provides less of a benefit while at the same time adding latency. That's because interrupts aren't sent as packets arrive, but are delayed while they're accumulated.

Considering online gaming is both low-bandwidth and latency sensitive, disabling interrupt moderation can improve response times. Additionally, disabling it has been known to improve DPC latency as well (see 'Taming the tickless timer' in last month's issue, page 80). Of course, disabling it means a slightly higher CPU usage while transfers happen, and with some games being quite demanding, having it enabled might seem like the better option. With today's multicore CPUs and most games only using one or two cores at most, there's usually plenty of processing power left over for the operating system and drivers to use.

ADAPTIVE INTERFRAME SPACING

Not present on all devices and drivers, interframe spacing is literally the gap between packets. While there's a minimum gap defined for TCP/IP, it's not normally used and it's possible to increase throughput and lower latencies by using a smaller interframe spacing. However, the trade-off is if packets are too close together they can get truncated or lost, necessitating retransmitting, in which case a greater delay is caused. Here the 'adaptive' part comes in and tries to tune the interframe delay to match network traffic, which it may or may not do successfully.

For this reason and because fast networks (Gigabit and above) tend to benefit less, Intel disables interframe spacing by default in its drivers, though it's still provided as an option because it's still a useful feature for 10/100 networks. Again, if latency is important, enabling it may give a slight edge. The effect of this one is harder to gauge for online gaming and file transfers, but as with Flow Control, give it a shot and see how it works on your system and your network.

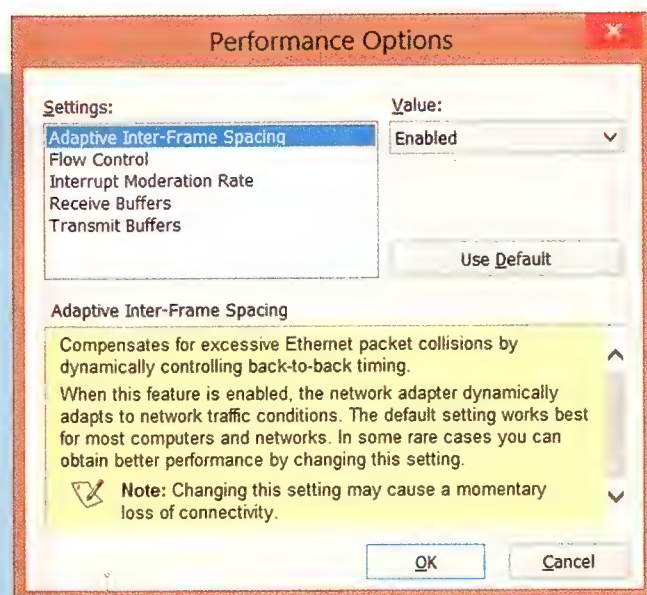
JUMBO PACKETS

The default packet size, also known as the MTU (maximum transmission unit) for TCP/IP is 1,500 bytes (or 1,514, if including the Ethernet header) and has been this way since the inception of Ethernet almost 30 years ago. However, times change and so does technology. While 1,500 was a good choice for the low-speed and less reliable networks at that time, it's a bit archaic today.

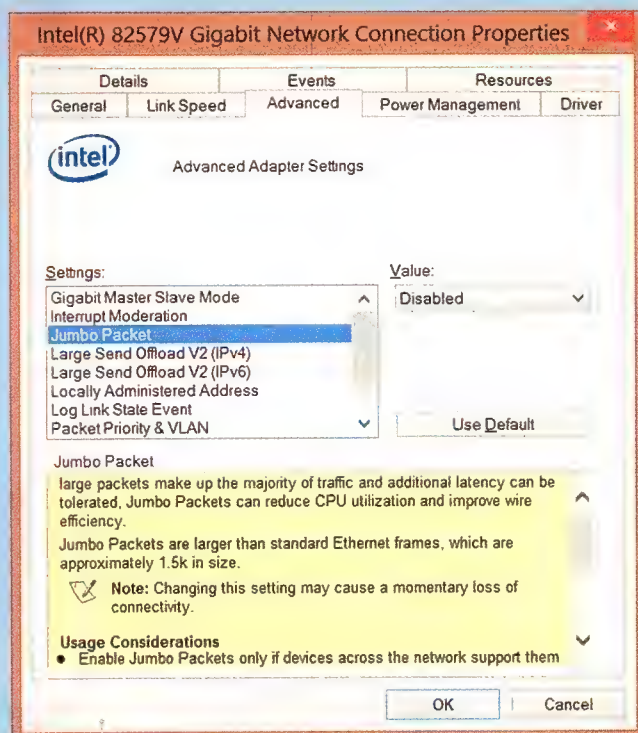
Enter jumbo frames, which are (loosely) any frame larger than 1,500, though they're typically used in sizes of 4,000 or 9,000. As you might expect, jumbo frames carry a larger data payload so they can transmit more data per packet. The result is faster network transfers, sometimes by a considerable margin. Less packets to transmit the same amount of data also has the side effect of being less CPU-intensive, too.

Setting it up is easy: simply tell your NIC to use jumbo frames (sometimes you've given a range of sizes, sometimes just 9,000 bytes) and the NICs of any client computers. For Linux, you can enable jumbo frames, irrespective of your NIC driver, by simply raising the size of the MTU for your Ethernet connection; for example, `ifconfig eth0 mtu 9000`.

Note that there are a few caveats: only Gigabit equipment can make use of them, your router or switch must also support jumbo frames or it won't work, and jumbo frames will have no bearing on your internet connection, which uses 1,500-byte packets, or technically 1,492 due to network address translation overhead. In fact, utilising jumbo frames to a client that doesn't support it will only cause a heavier network overhead as the packets are broken down into more manageable chunks or in some cases, are simply dropped.



Inter-frame spacing may help performance for some networks.



Jumbo packets can dramatically improve transfer speeds, but all devices must support it.

To see if your router or switch supports jumbo frames, look it up online or dig up that manual you hopefully didn't toss in the bin when you bought it.

You might notice some other options, such as 'Send and receive buffers' and 'Powersaving or EEE' (Energy Efficient Ethernet, also known as Green Ethernet) modes. It's a good idea not to touch the send and receive buffers your adapter uses – while larger ones can help compensate for poor network quality, they'll also introduce latency and can compound problems as retransmissions for packets get delayed further. Power-saving modes don't usually have an impact on performance, only on power usage (depending on network workload and idle modes), so there's usually no need to tweak them. **BTIC**

The other side of the coin

Ashton Mills discusses some of the lesser-known Linux distributions.

YOU'LL NEED THIS

CINNARCH

A Cinnamon-based distribution free from www.cinnarch.com.

DESCENT|OS

Based on MATE, get it from www.descentos.org.

MAGEIA

Uses Red Hat's RPM package manager. Head to www.mageia.org for details.

ARCHBANG

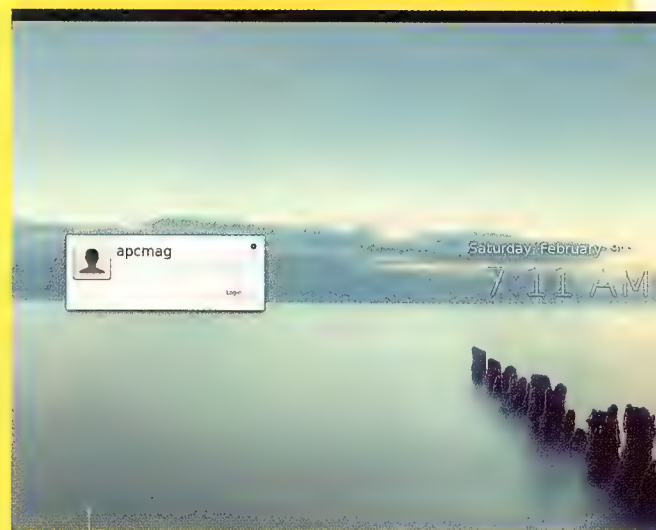
An Arch distribution downloadable from archbang.org.

Some time ago we talked about the risk the KDE team undertook to redesign KDE from the ground up, leading to the initially less-than-well-received KDE 4.0. Part of the reason for this was that a complete rewrite broke many common user interface abstractions and applications, leaving some KDE users out in the cold. However, as we noted then, this was a change that needed to happen in order to bring KDE up to speed with more modern design and it's now, after a number of years, flourishing.

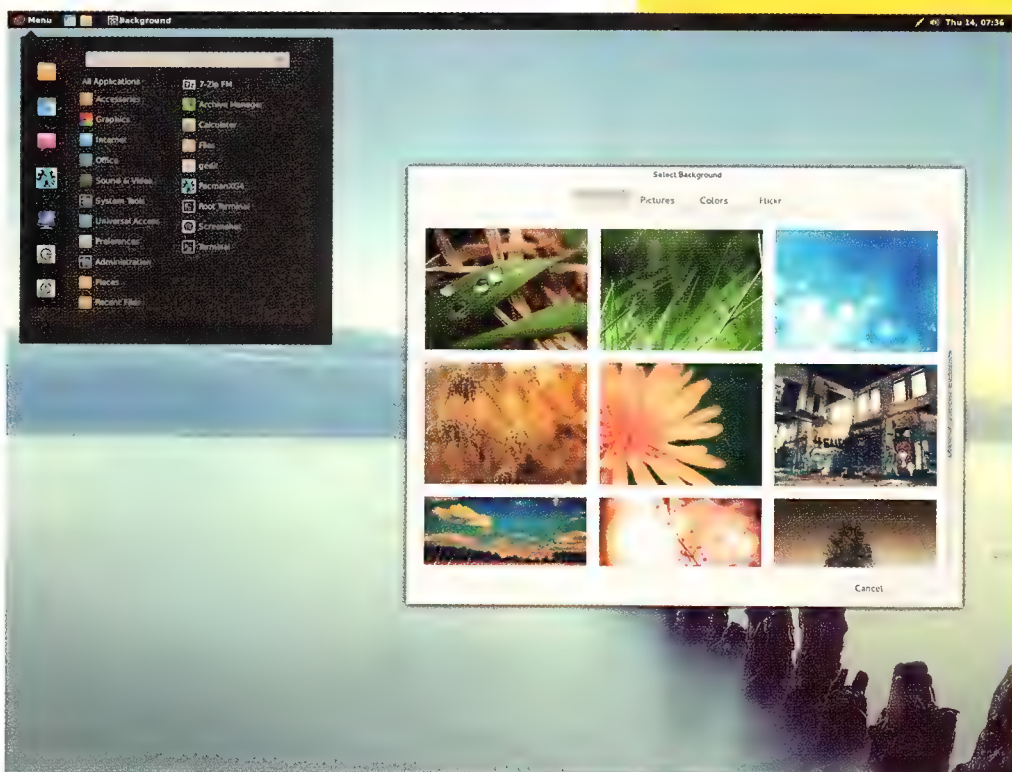
At the same time we noted how GNOME – the de facto interface for the Linux poster boy Ubuntu – was also starting to lag behind the times and that at some stage, it would also need a reinvention. And this happened, too, with GNOME 3.0, but it was such a divisive change that it effectively split GNOME into two versions and led Canonical to drive its own path with the Unity interface.

Beyond the official GNOME 3.0, two versions have since forked: the Mint-led derivative called Cinnamon and the continuation of GNOME 2.0 codebase known as MATE.

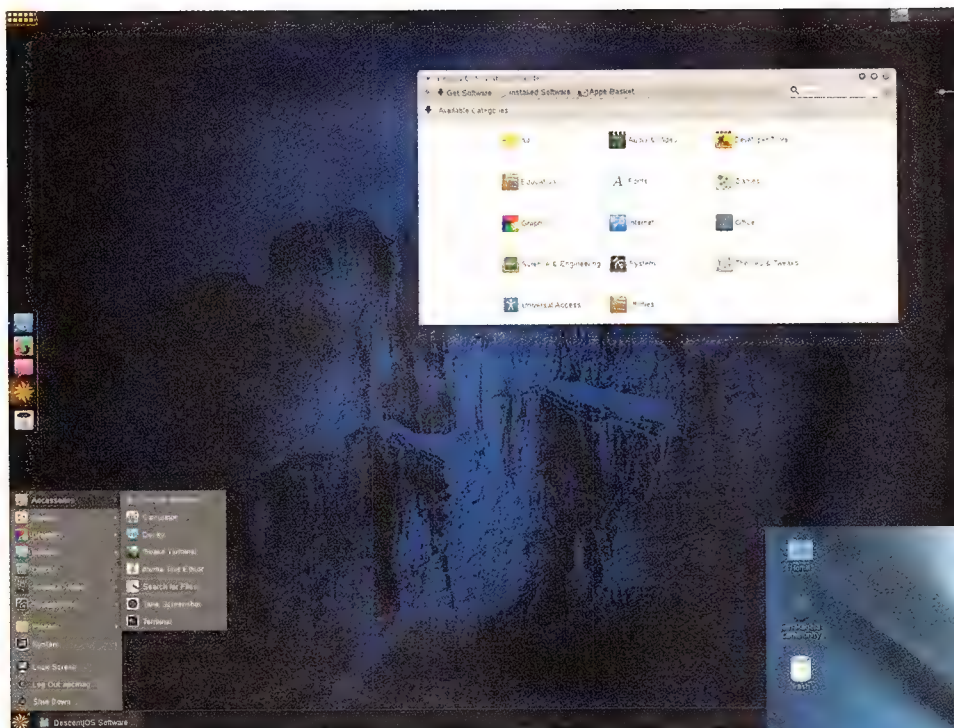
Both are excellent alternatives to the original GNOME 2.0 and Unity-based desktop you might be accustomed to and with KDE so mature as well, now is a good time to look at some lesser-known distributions that use Cinnamon, MATE and KDE as the base for their desktop environments. It's a



The LightDM manager is the same as in Ubuntu and makes for an aesthetically pleasing login experience.

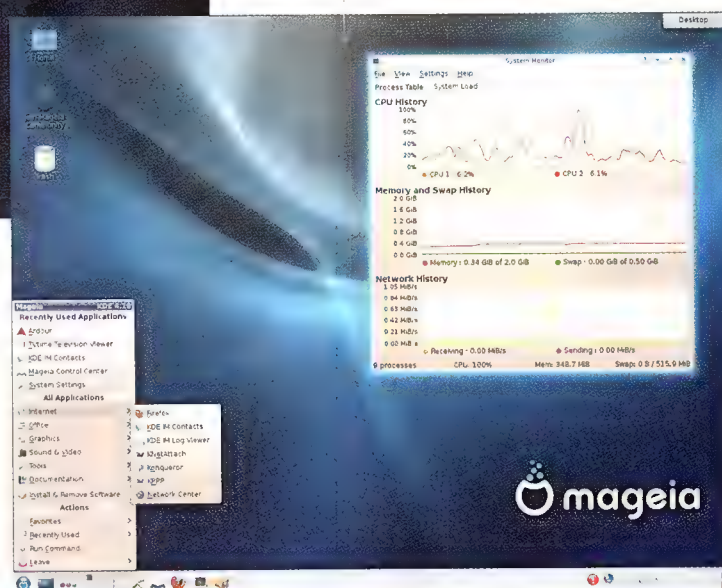


Cinnarch combines the latest GNOME-3.0 inspired Cinnamon desktop with the power and speed of Arch.



Descent|OS isn't as polished as some of the others, but it has an interesting take on the GNOME 2.0 fork MATE.

Mageia's KDE desktop uses the latest release combined with its own toolset for easy system configuration.



good way to explore what's on the other side of the fence and who knows, you may even find a new favourite distribution!

Before we proceed it's worth noting that we won't cover Mint here (www.linuxmint.com), partly because we've covered it before and partly because – and this is a compliment – it's grown so popular that it's now no longer a marginal distribution. Indeed, according to **DistroWatch.com** it's received more interest than Ubuntu for the last 12 months consecutively. If you haven't tried Mint you should, but also don't forget to give these lesser-known distributions a spin, too – they may well end up being the next Mint or Ubuntu.

CINNARCH

www.cinnarch.com

As its name implies Cinnarch is a Cinnamon-based distribution that uses Arch Linux as a base. If you're not familiar, Arch is a popular distribution among enthusiasts, as it manages to mix binary-based and source-based packages easily into the same cohesive whole. Source-based distributions are rare because they take some effort to maintain, with Gentoo being the de facto here (and yours truly was once a major Gentoo fan). Arch takes that philosophy and makes it a little more manageable with its Pacman package manager and option to install pre-compiled binaries.

Like Gentoo, it's slick and fast, but also leaves the configuration of what desktop environment to use up to the user. Here, Cinnarch tries to combine the Mint-inspired Cinnamon-based desktop with LightDM for a login manager.

The default look of Cinnarch is quite nice, incorporating GNOME 3.0's unified panel with the dark 'Minty' theme and beautiful, easy-to-read font called Cantarell. Bundled apps include Chromium, Shotwell, Pidgin, Transmission and an installer for LibreOffice. Media is handled by XNoise, an easy-to-use GNOME 3.0-based player and organiser.

Cinnamon itself is highly configurable, a departure from the reasonably dumbed-down subset of toggles GNOME 2.0 used to have. You can alter everything from how menus are displayed to the fidelity of the accelerated effects. Still, it's not quite as feature-rich in the options as KDE, but then KDE tends to overwhelm.

Upgrading Cinnarch is done through the PacmanXG application, a graphical front end to the Arch Pacman package manager. As with Gentoo, Arch uses a rolling release schedule – there are no official versions per se, but components of the operating system are regularly updated and you simply update your system as you go to 'get the latest version', as it were.

For Ubuntuers, Pacman is a little confusing at first, although there's much to like about the system. If you want you can simply fire up PacmanXG to update your system, but otherwise forget it's even there.

The only thing to note with Cinnarch is that the installer, launched from the LiveCD, is command line based only at the moment. It's simple enough to install via a Terminal window and the instructions are clear, so don't be put off if you're used to graphical installers.

If you're keen to give Cinnamon a spin and want to try an alternative distribution at the same time, Cinnarch fits snugly.

DESCENT|OS

www.descentos.org

Descent|OS is quite a young distribution, but it's interesting because it takes such a different tack with its implementation of MATE, the GNOME 2.0 fork. Perhaps aiming for a more advanced audience, Descent|OS bundles in the *Quake* console-inspired drop-down terminal Guake, as well as a preconfigured Docky paired with Slingshot to borrow some of the more prominent features of GNOME 3.0 and Mac OS X. Docky provides a docked side panel for launching common applications, while Slingshot zooms in a searchable categorised full-screen view of all programs on your system.

Being based on MATE, it's fast and plenty familiar if you're still not fond of the transition to GNOME 3.0 or Ubuntu's Unity desktops. Forked (and as a result often renamed) versions of classic GNOME 2.0 applications are included, such as the Puma text editor, Eye of MATE image viewer and Guayadeque music player. Other familiar programs include Firefox, GIMP and LibreOffice.

howto os challenge

Despite being relatively new, Descent|OS throws in its own Software Center tool, which has a really nice feature called the 'Apps Basket'. Rather than automatically downloading and installing apps from the Software Center as you click on them as with Ubuntu, they're first added to the 'Apps Basket'. Then, once you've finished shopping around, you can install them all as a batch in the background while you do other things. This is an ease-of-use feature Canonical could learn from Descent|OS.

Speaking of which, if you're worried about straying too far from the beloved Ubuntu you may be familiar with, Descent|OS is in fact based on Ubuntu and uses many of its software repositories. This also means you'll be familiar with the `apt` command and its general configuration layout if you're a command line junkie.

Descent|OS's publicly stated goal is to modernise the GNOME 2.0 (MATE) desktop and it does this reasonably well. It's low memory and quick, thanks to its base on MATE, while bundling in slick features like Docky and Slingshot. Docky especially is a brilliant tool and if you've never used it, this is a simple way to check it out (you can also install it in Ubuntu, but you need to decide what you want to do with the Unity bar).

Keep in mind that MATE as seen in Descent|OS is only one form. To try out another, check out Mint's MATE release. And in case you're wondering, MATE isn't named so for being friendly – it's simply derived from Yerba Mate, the ingredient in the South American tea drink of the same name. It has no other meaning in relation to GNOME, except perhaps to be viewed a relaxed alternative to GNOME 3.0!

MAGEIA

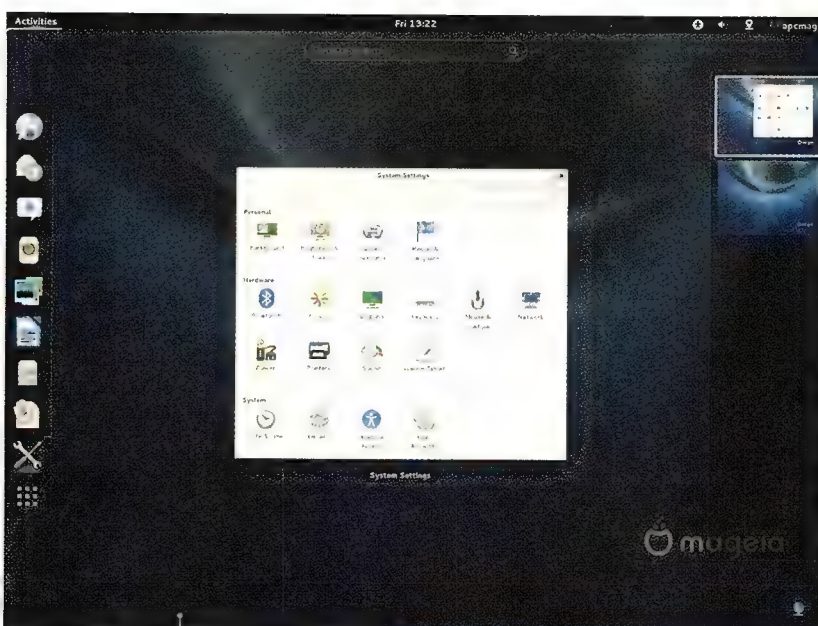
www.mageia.org

Mageia sounds like a new distribution, but its heritage lies in one of the oldest: back in the day, APC's own Linux Pocketbook, the first Linux-only magazine in Australia, carried a distribution known as Mandrake on its cover CDs. Mandrake was the first Linux distribution to try and make Linux accessible to the masses, long before Ubuntu came along. And it did an excellent job.

Mandrake later become known as Mandriva after the acquisition of Brazilian-based Conectiva (which produced Conectiva Linux) and to avoid litigation by a company called Hearst Corporation (owners of King Features Syndicate), which got its knickers in a twist thinking ordinary folk would somehow confuse a computer operating system with comic character Mandrake the Magician.

The Mageia Control Center is perhaps the best of its kind among all Linux distributions, with OpenSUSE a close second. Ubuntu has a long way to come here.

Mageia's GNOME 3.0-based desktop is more faithful to GNOME 3.0 and a good way to check it out if you're curious.



Mandriva is still around today, but much like Fedora forked from Red Hat, Mageia is a fork of Mandriva. It comes in two editions: KDE and GNOME, with the KDE version based on the latest KDE 4.10 release and the GNOME version based on GNOME 3.0. Traditionally, Mandriva and thus Mageia's default desktop is KDE, and it's certainly an excellent implementation of it, but the GNOME-based version is a great way to check out GNOME 3.0, too.

True to its roots, Mageia aims to make using Linux a simple affair and the Mageia Control Center, inherited from Mandriva, has over a decade of development behind it. It's well-organised and bundles a range of unique Mandriva-developed tools to make configuring elements such as internet sharing, parental controls and scheduled backups a snap. It even includes a tool to import Windows documents and settings.

Mageia uses Red Hat's RPM package manager and in terms of applications, relies on Rhythmbox, Empathy and Evolution for the GNOME version, while the KDE implementation makes use of KDE's suite of instant messaging, browsing and email tools. Both bundle LibreOffice by default as well. Mageia is heavy in multimedia and tools like the Audacity sound editor, Ardour session manager and even the tvtime television viewer are also installed by default.

Note that Mageia 3 beta 2 has just been released. If you decide to give it a go, grab this latest release as the previous Mageia 2 is a year old and much has changed since. Also note that during installation, while disk space isn't as much of a premium as it used to be, Mageia will automatically remove packages for hardware you *don't* have after detecting your system, saving a bit of space. Also nice is that once the install finishes, it automatically performs a full system update before dropping you to the desktop. It's little touches like these that have borne Mandriva and now Mageia far in the past, and it's no surprise that at the time of writing, Mageia was trending as the second most popular distribution on DistroWatch, just behind Mint.

ARCHBANG

archbang.org

Ah, another Arch distribution you say? Indeed, Arch is popular for a good reason. But what is ArchBang? Glad you asked! It's our left-field selection for today because it combines the slipstreamed base of Arch with the CrunchBang (crunchbang.org)-inspired desktop of Openbox. As a result, it's a great choice if you've never had the chance to play with either.

CrunchBang itself is yet another distribution, based on Debian, with the aim of 'looks, functionality and speed'. And this it does very well indeed – ArchBang operates at the speed of lightning. This is due to both the lightweight nature of Openbox and the slipstreamed nature of Arch: it takes roughly a few seconds to boot up, magnitudes faster than Ubuntu and even the zippy Windows 8.

Openbox as a desktop is a pleasure to use: it feels as light as it looks, which is an odd thing to say until you use it. A global menu is triggered by right-clicking anywhere on the desktop, where you can navigate to launch programs, load different places or configure the system.

The only element on the desktop is one of CrunchBang's calling cards – a preconfigured Conky display. Conky is basically a system information tool, but its simplicity belies its power. It's so configurable that it can be set up to tell you the weather, control your music and even launch Skynet for global domination we hear. It's so powerful there are threads on most distribution forums for configuring it, including Ubuntu's, with hundreds of configurations to try. Indeed, configuring Conky is almost a hobby itself.

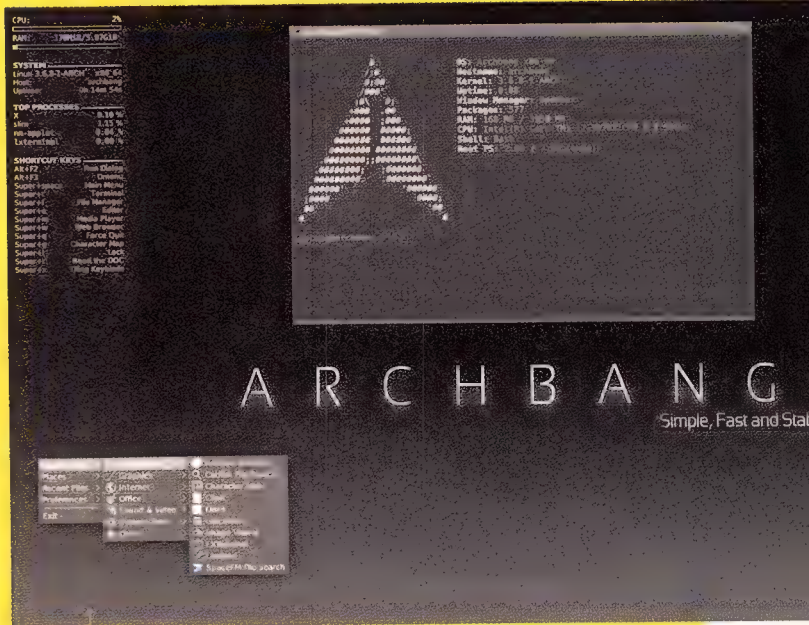
However, in line with its clean look and feel, the Conky configuration included in ArchBang is simple, displaying basic CPU, RAM and process stats, along with a handy list of shortcut keys to help you learn ArchBang. There's nothing stopping you changing the configuration and when you want to do so, there's even a menu option included in Openbox to edit the Conky file and restart it.

In terms of applications, many lightweight versions of common tools are included, such as the Leafpad text editor and SpaceFM file manager. More familiar programs are also present including the GNOME Media Player and Firefox, which looks great with the dark ArchBang theme.

Openbox is a significant departure from the classic GNOME, KDE or Unity desktops, which is a good thing. If you've not had a chance to try it



A no-mess, no-fuss login screen.



Clean, fast and easy to use, the Openbox desktop looks great and is paired with a preconfigured Conky display.

or Arch before, the combination is hard to pass up. Of all the distributions we've covered here, this is our favourite. Its slipstreamed nature is also ideal for low-memory or low-power systems: after bootup, ArchBang uses just 130MB of memory. By comparison, Ubuntu 12.10 on the same system chucks up 390MB.

The only thing to note is that its installation routine is text-based, much like Cinnamon's installer, and that you'll need to manually partition your drive as there's no automatic 'use the whole lot' option. If you're trying it out in a virtual machine, however, this is simple enough.

Of course, all of these distributions are just a sample of the many on offer, but demonstrate how diverging desktop interfaces of the GNOME forks and KDE are being implemented. Hopefully you'll find something you haven't seen before and if any tickle your inner penguin, give them a go! [ETC](#)

Get a handle on your iPhone videos

Matthew J. C. Powell explains how to manage your videos for free.

YOU'LL NEED THIS

ITUNES

You'll need a copy of the iTunes software from www.apple.com/au/itunes.

IPHOTO

The iPhoto app (\$5.49 from tinyurl.com/bxcg3wh) makes this process a whole lot easier, although it's not required.

The iPhone is brilliant for taking videos, but it has limited storage, so you don't want to keep too many on there. Modern Macs have tons of storage space, but you don't want to have to sit in front of your computer to watch your videos. iOS devices, including the Apple TV, are great for streaming video content from your computer to anywhere in your home.

Sounds perfect, right? Except there's one flaw (two, actually, but I'll get to that): iOS devices stream video using iTunes Home Sharing – that is, from your iTunes library – while your iPhone videos end up in your iPhoto library, mixed in with all the photos you take with your phone. The reasons for this are historical and have to do with the way the Mac retrieves videos from still cameras.

What you want is a way to get videos off your phone into a central library from which they can be easily shared with your various devices. As yet, Apple hasn't provided that. However, the extra steps to achieve this are relatively small. It's not all that difficult to get those video files into your iTunes library with minimal fiddling. In fact, there are third-party apps that will do it for a small fee. I wouldn't bother, though, since the apps Apple provides are good enough and free.

First, get the videos off your phone. When you record a video on your phone, you may notice it doesn't go into the Videos app, where you might like it to. Rather, it goes into your Camera Roll.

When you plug your iPhone into your Mac, most likely iTunes starts up automatically, unless you've told it not to. iTunes, of course, syncs anything you've bought from the iTunes Store to and fro between your Mac and your phone. It will grab photos from your iPhoto library and put them on your phone, but it doesn't go the other way around and grab anything from your phone to put in your photo library. For that, you need another app.

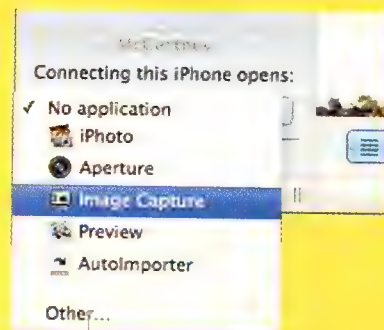
Perhaps you have Apple's iPhoto, which is \$5.49 from the App Store. If so, great; if not, you don't need to buy it just to get these videos off your phone – I promised you freedom! Deep in your 'Applications > Utilities' folder you'll find something called Image Capture. You've probably never opened it and I'm starting to suspect Apple's forgotten it's there. It's handy, though.

Open up Image Capture and then plug in your iPhone. In the sidebar on the left you'll see a picture of it among your attached and shared devices from which images may be captured. Click on it and you'll see all of the photos and videos in your phone's Camera Roll, in one big list.

Unfortunately, Image Capture doesn't yet have any real filtering or search capabilities. The easiest way I've found to group all the videos together is to sort by the 'Size' column. Chances are, most of your videos will be among the largest files in the Camera Roll. Any videos smaller than a photo are probably one- or two-second videos you took by accident when you didn't realise the phone was in video mode. If you want to keep them, by all means do, but you'll have to find them the hard way. Look for files whose extension is MOV.

Select them all and either drag them to a folder or use the drop-down menus at the bottom of the Image Capture window to choose a location and click 'Import'. 'Import All' will grab everything, rather than just the files you've selected. A few minutes later, you'll have a folder full of your videos, complete with unhelpful filenames and in no particular order.

Next, open iTunes. Select all the items in your folder full of iPhone movies and drag them onto the iTunes window. iTunes will proceed to import them into your library and class them as movies. Incidentally, if you're an iPhoto user and you've imported your videos along with your photos, you can drag them straight from the iPhoto window to the iTunes window to



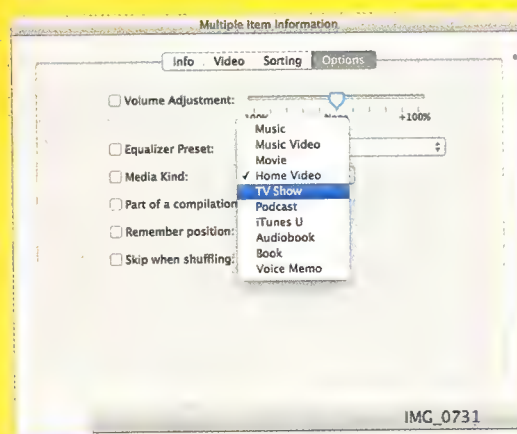
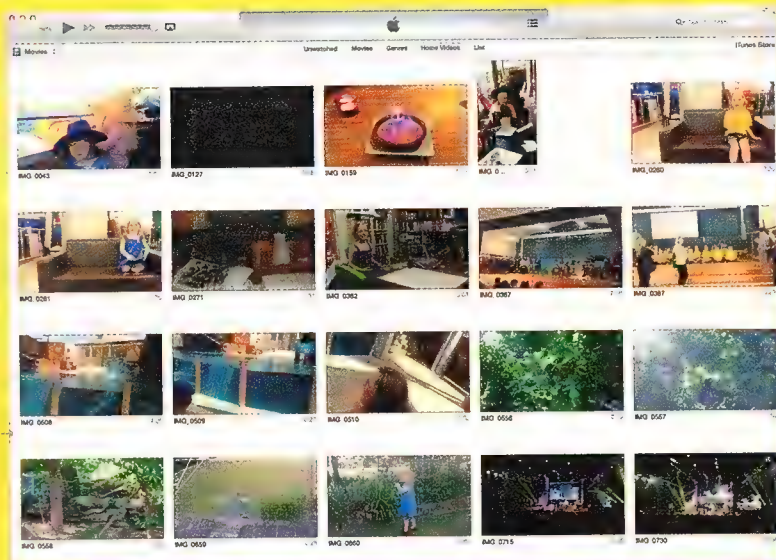
You can set Image Capture to open automatically when you connect your iPhone.

Image Capture lets you sort files by size, so it's easy to find the videos, then import them to a folder on your hard drive.

Name	Date Modified	Size	Kind
IMG_0260.MOV	18/10/2012 5:11 PM	16.6 MB	QuickTime movie
IMG_0271.MOV	18/10/2012 10:50 PM	196 MB	QuickTime movie
IMG_0362.MOV	12/11/2012 9:05 PM	642.7 MB	QuickTime movie
IMG_0367.MOV	15/11/2012 8:49 PM	1.03 GB	QuickTime movie
IMG_0387.MOV	21/11/2012 12:30 PM	57.9 MB	QuickTime movie
IMG_0508.MOV	24/11/2012 1:13 PM	524.5 MB	QuickTime movie
IMG_0509.MOV	24/11/2012 2:19 PM	57.4 MB	QuickTime movie
IMG_0510.MOV	24/11/2012 2:20 PM	4.5 MB	QuickTime movie
IMG_0556.MOV	24/11/2012 4:12 PM	42.5 MB	QuickTime movie
IMG_0557.MOV	24/11/2012 4:16 PM	245.2 MB	QuickTime movie
IMG_0558.MOV	24/11/2012 4:18 PM	115.1 MB	QuickTime movie
IMG_0659.MOV	06/12/2012 5:30 PM	84.6 MB	QuickTime movie
IMG_0660.MOV	06/12/2012 5:34 PM	2.7 MB	QuickTime movie
IMG_0715.MOV	09/12/2012 2:11 PM	2.7 GB	QuickTime movie
IMG_0730.MOV	09/12/2012 2:47 PM	2.3 GB	QuickTime movie
IMG_0731.MOV	09/12/2012 2:48 PM	51.2 MB	QuickTime movie
IMG_0732.MOV	09/12/2012 3:09 PM	2 GB	QuickTime movie
IMG_0773.MOV	13/12/2012 2:29 PM	105.3 MB	QuickTime movie
IMG_0774.MOV	13/12/2012 2:31 PM	133.9 MB	QuickTime movie
IMG_0775.MOV	13/12/2012 2:43 PM	289.2 MB	QuickTime movie
IMG_0776.MOV	13/12/2012 2:44 PM	17.5 MB	QuickTime movie
IMG_0777.MOV	13/12/2012 2:47 PM	269 MB	QuickTime movie
IMG_0778.MOV	13/12/2012 2:50 PM	6.9 MB	QuickTime movie
IMG_0779.MOV	13/12/2012 2:55 PM	537.5 MB	QuickTime movie
IMG_0836.MOV	18/12/2012 7:17 PM	102.9 MB	QuickTime movie
IMG_0959.MOV	22/12/2012 3:25 PM	181.6 MB	QuickTime movie
IMG_0960.MOV	22/12/2012 3:43 PM	873.8 MB	QuickTime movie
IMG_0961.MOV	22/12/2012 4:01 PM	12.3 MB	QuickTime movie
IMG_0967.MOV	18/11/2012 12:32 PM	5.3 MB	QuickTime movie
IMG_0968.MOV	23/12/2012 4:12 PM	781.1 MB	QuickTime movie
IMG_1007.MOV	24/12/2012 9:11 PM	257.2 MB	QuickTime movie
IMG_1008.MOV	24/12/2012 9:12 PM	104.9 MB	QuickTime movie
IMG_1009.MOV	24/12/2012 9:12 PM	24.3 MB	QuickTime movie
IMG_1010.MOV	24/12/2012 9:13 PM	66.5 MB	QuickTime movie
IMG_1011.MOV	24/12/2012 9:20 PM	536.8 MB	QuickTime movie
IMG_1075.MOV	01/01/2013 12:09 AM	4.9 MB	QuickTime movie
IMG_1076.MOV	01/01/2013 12:15 AM	64.8 MB	QuickTime movie
IMG_1094.MOV	05/01/2013 11:52 AM	3.32 GB	QuickTime movie
IMG_1097.MOV	06/01/2013 5:30 PM	57 MB	QuickTime movie
IMG_1247.MOV	07/01/2013 12:40 PM	49.9 MB	QuickTime movie
IMG_1248.MOV	07/01/2013 12:41 PM	36.8 MB	QuickTime movie
IMG_1250.MOV	07/01/2013 1:01 PM	21.4 MB	QuickTime movie
IMG_1335.MOV	16/01/2013 10:17 AM	3.7 MB	QuickTime movie
IMG_1337.MOV	16/01/2013 10:18 AM	2.7 MB	QuickTime movie
IMG_1340.MOV	16/01/2013 10:19 AM	4 MB	QuickTime movie
IMG_1406.MOV	16/01/2013 11:09 AM	1.68 GB	QuickTime movie
IMG_1446.MOV	19/01/2013 2:02 PM	270.3 MB	QuickTime movie
IMG_1456.MOV	19/01/2013 2:07 PM	279.8 MB	QuickTime movie
IMG_1457.MOV	19/01/2013 2:08 PM	85.5 MB	QuickTime movie
IMG_1458.MOV	19/01/2013 2:08 PM	43.9 MB	QuickTime movie
IMG_1567.MOV	20/01/2013 6:37 PM	26.8 MB	QuickTime movie
IMG_1568.MOV	20/01/2013 6:38 PM	57.1 MB	QuickTime movie
IMG_1885.MOV	09/02/2013 11:01 PM	83.8 MB	QuickTime movie
IMG_1886.MOV	09/02/2013 11:01 PM	2.8 MB	QuickTime movie
IMG_1918.MOV	10/02/2013 9:12 PM	59.9 MB	QuickTime movie

The files are off my phone now, but I'm not much better off in terms of finding the one I want.

Introducing the 'Home Videos' section in iTunes 11 means Apple is at least making a start fixing this.



Tell iTunes that the home video you created is a TV show and it will believe you. iTunes is gullible.

Using the other tabs under 'Get Info', you can give your 'show' and individual episodes a name and descriptions.

import them. I like the Image Capture method because it's easier to group all the videos together.

If you're using iTunes 11, you can click on the 'Home Videos' tab to see them all grouped together, separately from stuff you've bought from the iTunes Store.

The fact that there's a 'Home Videos' tab gives me hope that Apple is aware of the problem here and maybe even working on a solution. Unfortunately, it's not there yet; for example, when you share your iTunes library to the Videos app on an iPad, the iPad doesn't have a 'Home Videos' tab, so your movies are still mixed with everything else.

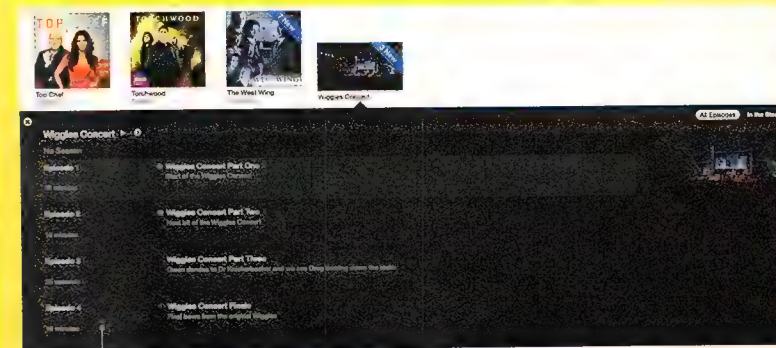
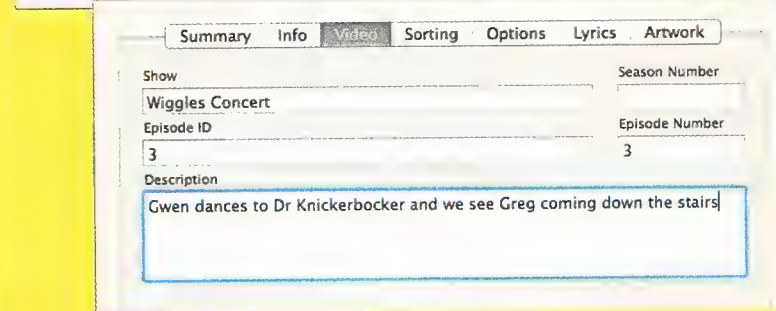
Now, take control. You could, of course, just go through and give each of those videos under 'Home Movies' a name rather than the 'IMG_number.mov' with which it's currently monikered. They're all still a bit higgledy-piggledy and not well sorted, but if logical naming would be enough for you, you're done and you can stop reading now.

It's not enough for me. I like videos that are about the same thing to be grouped together somehow, so I don't have to go hunting for things. To impose even more order into your video chaos, you need the video equivalent of a photo album: a TV show.

If you have a group of related videos – movies taken at a birthday party, for instance – select them all and press Command-I or right-click 'Get Info'. You'll be asked if you want to change information for multiple items – say 'Yes' because that's exactly what you want to do. In the 'Info' window, click on 'Options'. You'll see a pull-down menu labelled 'Media Type' which will presently be set to 'Home Video'. Click on it and change it to 'TV Show'. Still in the 'Info' window, click on the button marked 'Video', give your new show a name and then click 'OK'.

Your movies will vanish from the 'Home Videos' section on iTunes. Switch to the 'TV Shows' tab in iTunes and find the show you created. Click on it and you'll notice that the episodes all still have their old nondescript filenames and bear the title 'Episode 0'. If you wish, select each episode in turn, select 'Get Info' and edit the information under the 'Video' tab. Give each episode a name, an episode number and a short description. If you want to go really crazy, give them cover art.

The beauty of this technique is that like 'real' TV producers, you can always add more episodes. Create a TV show called 'My Kids', for instance, and add all your future videos of the kids to it as episodes so they're grouped together. [Full Tutorial](#)



Once you've finished, you've decluttered your library and made your videos much easier to find.

Printing from iOS

Matthew J. C. Powell shows you how to use AirPrint to print from your iPhone or iPad.

YOU'LL NEED THIS

AIRPRINT-COMPATIBLE PRINTER

Check to see if your printer is supported at tinyurl.com/AirPrintList.

FINGERPRINT

For Windows users, this app (US\$19.95 from www.collobos.com/airprint) allows you to print to shared non-AirPrint printers.

PRINTOPIA

This US\$19.95 app from www.ecamm.com/mac/printopia is our choice for Mac users.

In 2007, no-one really ever thought of printing things from a telephone. So it kind of made sense that when Apple went about deciding what functionality to include in its pared-down mobile version of OS X and what to leave out, printing was in the latter list. It wasn't until iOS 4.2 in late 2010 that the technology to print from an iPhone or iPad was added. That technology is called AirPrint.

AirPrint uses Bonjour (Apple's name for zero-configuration networking), which eliminates the need to fiddle with ports and network settings (mostly). It also eliminates the need to install drivers or PPDs for different printers, though this does lead to a certain 'lowest common denominator' level of functionality.

As the name suggests, AirPrint works over wireless networks. However, there are ways to make it work with non-wireless printers (more on that in a minute). At the time of its release, there were only 10 printers on the market that supported AirPrint. That list has now grown to over 450 (you can find the list at tinyurl.com/AirPrintList). Of course, there are ways to make it work with printers that aren't on that list, too.

Before Apple built printing capabilities into iOS, printer manufacturers and some third-party developers had already come up with their own solutions to the conundrum of printing from iPads and iPhones. If you have a printer that's not AirPrint compatible, it's worth having a look to see if the manufacturer has created a workaround for you.

PRINTING WITH AIRPRINT

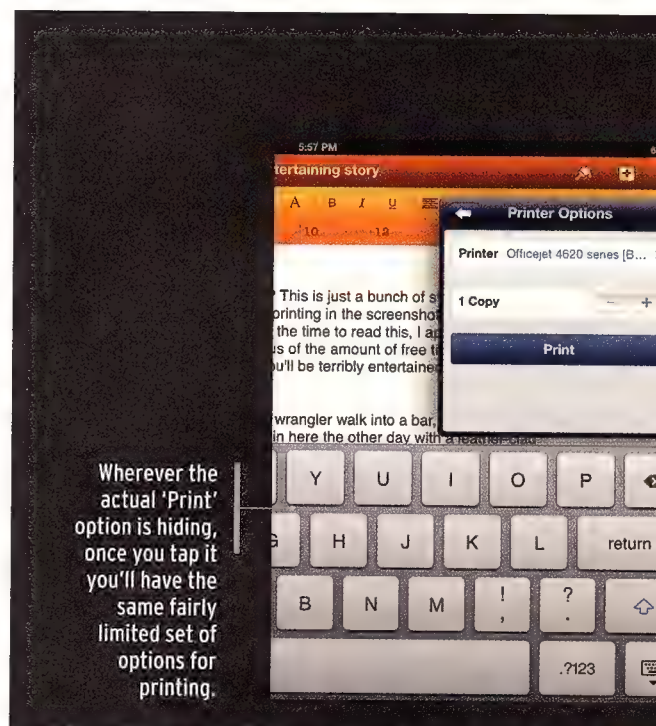
If your printer does support AirPrint (and presuming you've got it connected to a wireless network), printing is fairly straightforward. The only caveat is that because printing wasn't built into iOS right from the start, the interface for doing it isn't entirely consistent across apps.

For instance, in Apple's Pages app, when you want to print something you tap on the little wrench icon for the 'Tools' menu (it's a tool, get it?), then 'Share and Print > Print'. In the Mail app (also by Apple), you tap on the up-and-to-the-left arrow in the upper-right corner, which you'd normally tap on to reply to an email, and you'll see the options to 'Reply', 'Forward' or 'Print'. In iPhoto, another Apple app, you tap the up-and-to-the-right arrow in a box in the upper-right corner, which denotes the 'Share' menu. You'll then see 'Print' as one of your options for sharing.

Eventually, most apps should standardise on the 'Share' menu method, but right now it's a bit of a dog's breakfast from a user interface viewpoint.

Whichever path a given app takes to get you to the word 'Print', when you tap on it you'll be taken to the 'Printer Options' dialogue. If you haven't set up a printer on your network before, tap on the arrow to select a printer and your device (iPhone or iPad) will go looking for one. If it finds an AirPrint-compatible printer, tap on its name and you'll go back to the 'Printer Options' page. Then just tap 'Print' and away you go.

You'll notice that you don't get much in the way of options: the number of copies... and that's about it. If you want to set a different paper type, quality or other settings like that, you'll have to access the printer's configuration page via Safari. To do that you'll need your printer's IP address, which is usually accessible from its display panel. It's fiddly and exactly what



options you get will vary from one printer to the next. Hopefully Apple will improve this sooner rather than later.

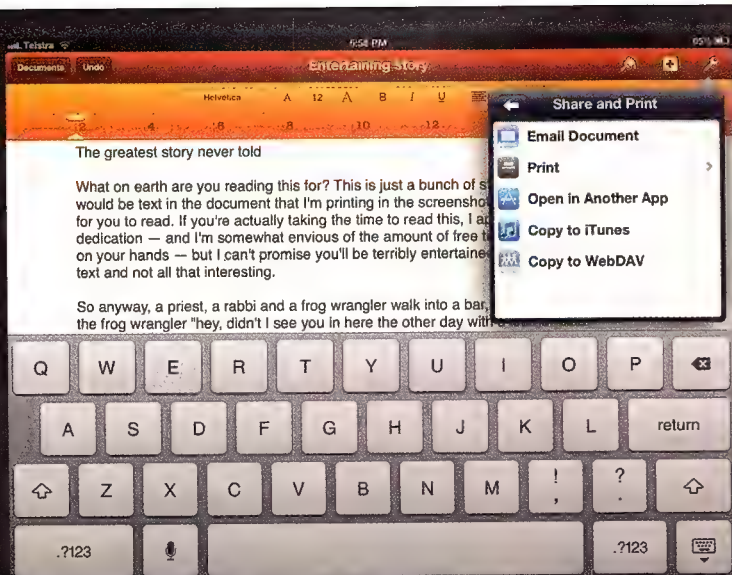
PRINTING TO A NON-AIRPRINT PRINTER

If your printer doesn't support AirPrint out of the box, don't despair. If it's shared with another computer on the network (either wired or wirelessly), you can use it by using the computer as an intermediary to a virtual printer accessible via AirPrint.

If you're a Windows user, get FingerPrint by Collobos (www.collobos.com/airprint). It costs US\$19.95, but a free trial version is available. There's a Mac version of FingerPrint as well, but for Mac users I suggest Printopia by Ecamm (www.ecamm.com/mac/printopia). Printopia is also US\$19.95, but there's a free demo. The free demo of Printopia is fully functional and free for a week, while the free demo of FingerPrint isn't time-limited but prints a watermark (I prefer Printopia's approach).

Printopia adds a pane to OS X's 'System Preferences'. Once installed, you simply add the printers and services you wish to activate – any printer (wired or wireless) that your computer can use is available to you. Switch on sharing and then any app with printing capabilities on your iOS devices will see those printers and services.

FingerPrint isn't a 'Preferences' pane, but a separate application, which needs to be running in order for AirPrint to work, which is another reason I prefer Printopia). Printopia also offers a range of paper sizes and various other options, but as these don't show up when you actually try to AirPrint something (or at least they didn't for me), I don't know why they're there.



There's more than one way to print a document. If your printer supports AirPrint, then use the 'Print' menu. If not, see if your printer's manufacturer has its own app and use the 'Open in Another App' trick.

PRINTING USING A THIRD-PARTY APP

Epson, Canon, HP and Fuji Xerox each have their own printing apps in the App Store, and Readdle has an app (Printer Pro) that can be used to print to a range of otherwise-unsupported wireless printers. With these, you don't need to use a computer as an intermediary, just print straight to the printer. I've found that this generally produces a better-quality print than using the virtual printer method.

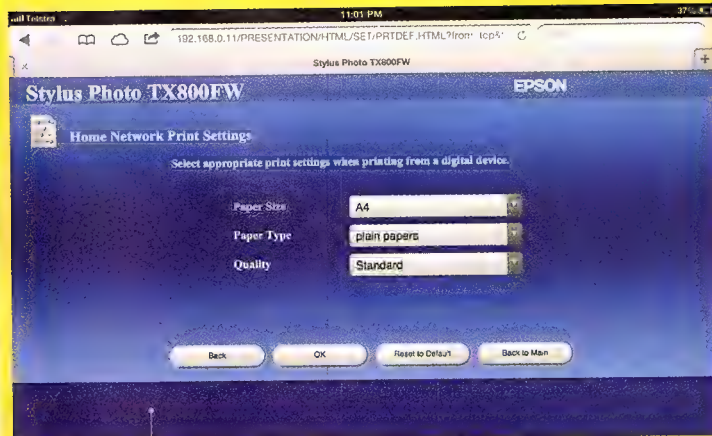
Not only that, but the apps (particularly those made by the printer manufacturers) are more configurable in terms of being able to use the full capabilities of your printer: paper sizes, quality, orientation and so forth. AirPrint can be very generic in that way.

To use one of these with documents located on your iPad, the app you're printing from must support iOS's 'Open In' feature. Mail (for attachments), Safari, iPhoto and the iWork apps all do, along with many others including all of the various office apps that I've seen such as Quickoffice, and document repositories such as GoodReader.

Epson and HP's apps support printing documents from online sources such as Dropbox, **Box.net** and Evernote as well, while the Epson and Canon apps also support those companies' scanner functions on multifunction devices. Printer Pro supports printing from Dropbox and Google Drive.

In Pages, you'll find the 'Open in Another App' option under the 'Share and Print' menu mentioned above. You can also find it in the 'Documents' screen by tapping 'Edit' (even though you're not editing anything) and then the 'Share' icon (which is suddenly in the upper-left corner instead of the upper-right – the interface needs work). Either way, you then have to select a format in which you want to open it. I suggest PDF or Word, since the third-party printing apps don't generally support Pages files.

Printing from iOS isn't yet as easy or as flexible as it could be, but we've come a long way from when we couldn't do it at all. **8116**

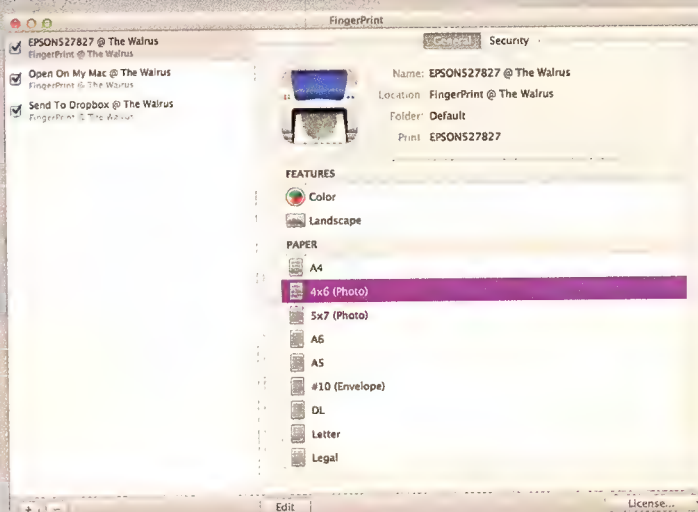


AirPrint's options are limited, so if you want to use your printer's capabilities better, you may have to find its configuration page via Safari.

If you use one of the printer manufacturers' apps (Epson's iPrint shown here), you'll probably have much more control over how your print comes out.



Printopia (right) installs on the Mac as a pane in 'System Preferences', while FingerPrint (below) is a separate app. Both basically work in the same way. FingerPrint is also available for Windows.



Create a Wi-Fi ebook experience

Simon Chester shows you how to access all your ebooks, no matter where you are, without plugging in a cable.

YOU'LL NEED THIS

CALIBRE

Get this free ebook library management software from calibre-ebook.com.

CALIBRE COMPANION

This Android app is available on Google Play for \$2.99.

MOON+ READER

Available for free (Pro version is US\$4.99) from www.moondownload.com.

With the right software and a little port forwarding, you can kiss wires goodbye and access your entire ebook library over Wi-Fi, or even remotely.

The first bit of software you need is Calibre – the free ebook library management software for Windows, Linux, and OS X. Available from calibre-ebook.com, Calibre is a great way to organise your collection of ebooks. It allows you to download accurate metadata (including author, ISBN, reviews and cover art) and add in, browse, sort or search by genre and series tags, or rating. I can't recommend it enough.

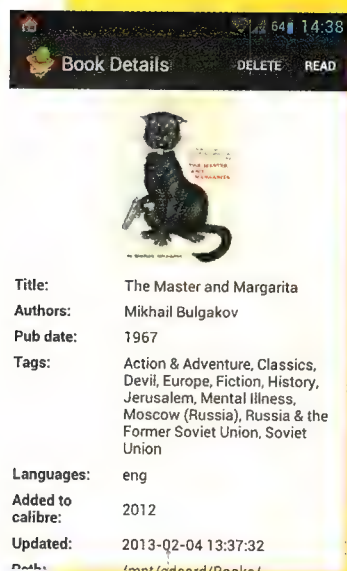
Calibre is more than just ebook library management software, however, as it also allows you to transfer books, including their metadata and covers, to just about every make of ereader on the market, converting the files as necessary for compatibility. The standard way of doing this is via USB, but it also allows you to run an HTTP content server, which makes your library accessible by a web browser (if you're good with port forwarding, that includes any browser in the world). For info on all the things Calibre can do, visit manual.calibre-ebook.com.

Android users have a distinct advantage over other ereader users, including those on iOS, as there is now an Android app that allows wireless connection with Calibre, as if it was plugged in directly. Calibre Companion (\$2.99 on the Play Store) is a semi-official app by MultiPie Ltd that provides a method of getting ebooks onto your device. It isn't an ereader application, but rather allows you to browse for and

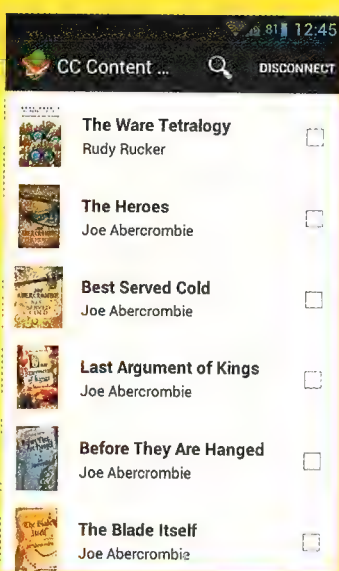
download books from your Calibre library and then pass them onto your ereader app of choice. Mine is Moon+ Reader, largely because of its integration with Dropbox, which syncs reading progress between my tablet and my handset. It's available for free, or US\$4.99 for the Pro version, from www.moondownload.com. It even checks for and updates any changes made to metadata files in Calibre.

Calibre Companion requires a little setup, but if you have problems, visit tinyurl.com/9wmzvsv. All you need to do is, in Calibre, click on the 'Connect/share' button at the top of the screen and then 'Start wireless device connection'. Open the Calibre Companion app on your phone and click 'Connect > As Wireless Device'. You can then transfer books using Calibre as if the phone was connected over USB: i.e. just right-click a book in Calibre and select 'Send to device'.

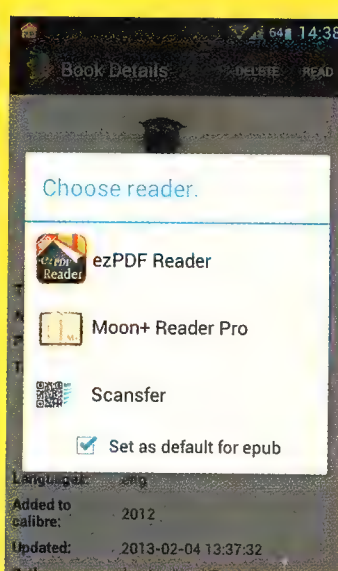
You would have noticed the other option under the 'Connect' menu in Calibre Companion: 'Connect > To Content Server'. If you're away from your PC, and both Calibre and its content server are running ('Connect/share > Start Content Server'), you can use this to access and download ebooks from your library, directly from your handset. You can even bypass Calibre Companion altogether (saving \$3) and access the content server through your handset browser or compatible ereader app. For remote access, portforward.com offers a fairly comprehensive list of guides for the many router models out there – just ignore the ads for the software. **ETC**



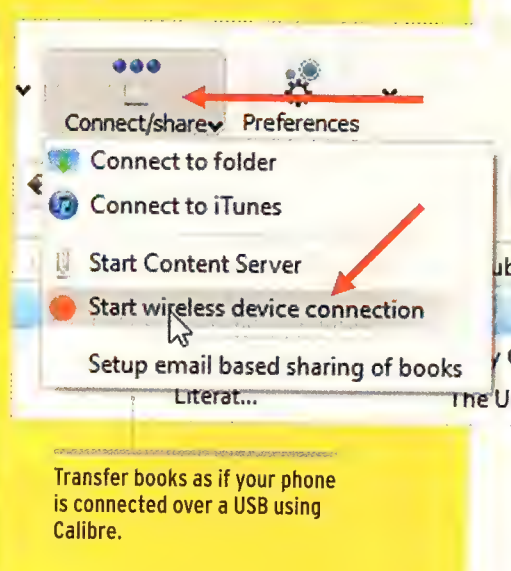
Download accurate metadata with Calibre.



Calibre's ebook library management software is a great way to organise your ebooks.



Our ereader app of choice is Moon+ Reader Pro.



Activate the Android 'tablet' interface

Simon Chester explains how to force a pure tablet interface, rather than the phone UI, on your Google Nexus 7.

U'LL NEED THIS

GOOGLE NEXUS 7

Your trusty 7in tablet.

DEODEXED ROM

Head to tinyurl.com/caaqlcq for the latest version.

ODEXED ROM

If you're running a stock ROM, tinyurl.com/clqkd7m has the files you need.

Since Ice Cream Sandwich came along, Android has provided two slightly different user interfaces, depending on the size of your device's screen – specifically, the location of the clock and notification bar is down the bottom of tablet screens, but up the top of handsets. Further to this, certain apps, when run on the tablet version of the UI, will provide frames that aid in navigation – known as 'Fragments' in Android speak (see tinyurl.com/c96jpsr) – but not when run on a phone UI. It's a good way to run a single app across devices with different screen sizes, while still providing an optimal interface.

However, the rise of 7in tablets, or indeed the bastardised 'phablets' like the Samsung Galaxy Note series, have made these UI distinctions a little less clear cut. With the Nexus 7, for instance, Google decided to have it force the phone UI, meaning that you miss out on fragments in apps, even though you probably have the screen real estate to support it.

But what if you prefer the tablet UI? As is the benefit with an open-source operating system (an OS OS, if you will), a group of people have banded together to find a solution. These mods require your Nexus 7 to be running either a stock ROM from Google, a ROM based on the Android source code (AOSP) or one based on CyanogenMod (this is most ROMs).

There are two versions available: one for deodexed ROMs (see tinyurl.com/am2urtj to find out what this means) and one for (stock) 'odexed' ROMs. Chances are that if you're running a custom ROM, it's already been deodexed.

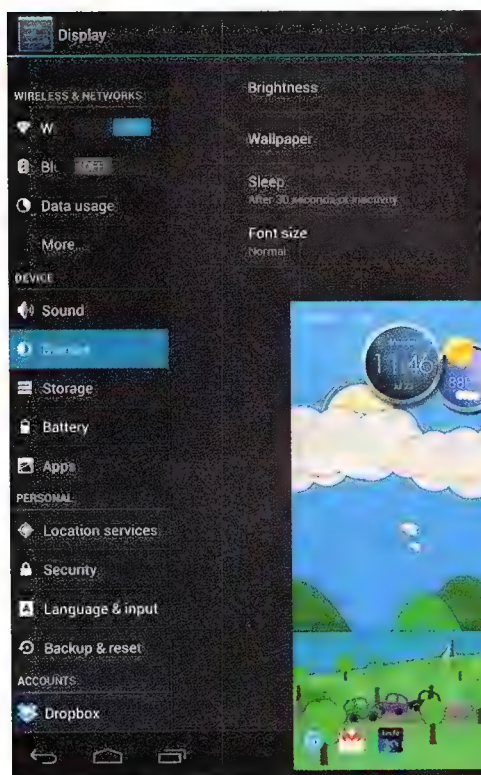
This is actually a rather simple task, as all the required mods have been compiled into a flashable ZIP file. Scoot on over to tinyurl.com/caaqlcq to grab the latest version of the file. If you're running a stock odexed ROM, a quick visit to tinyurl.com/clqkd7m will give you the files you need.

After copying the files to the internal storage of your device, you need to boot into Recovery. Most ROMs have this as an option in the 'Shutdown' menu, but if not, turn off the device and then turn it back on by holding both volume buttons while the device is plugged into your computer.

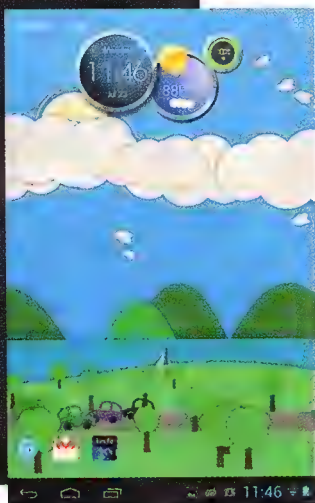
Next, simply select 'Wipe cache partition' (dalvik), then 'Install zip from sdcard > Choose zip from sdcard > O/' (this is the user directory where you would have copied the file) and select the file you just downloaded. Now just reboot and revel in the tablet UI glory.

While these ZIP files will work only on the Nexus 7, there's enough information on the page links above for you to make the modifications yourself on other devices.

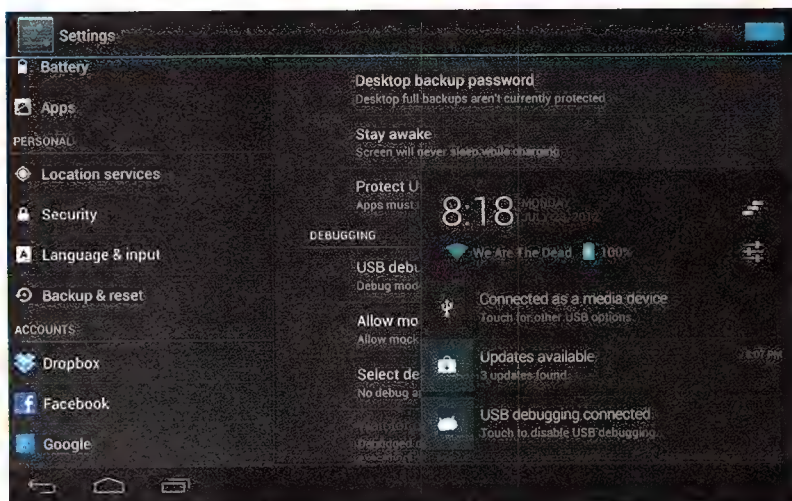
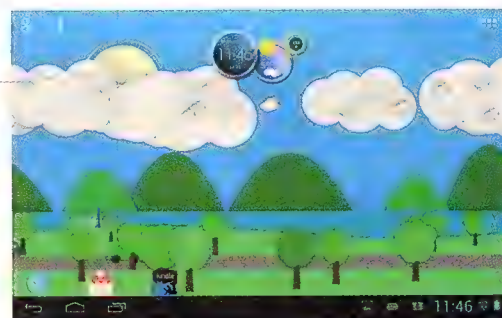
However, there's no guarantee that they will work or even leave your device unscathed, so I recommend a good backup first. ☹️



On a tablet, the clock and notification bar is now on the bottom of the screen; on a phone it's at the top.



'Fragments' provide frames aiding in navigation for the tablet UI but not on the phone UI.



Boot drive migration

Neil Mohr shows how easy it is to migrate to an SSD.

YOU'LL NEED THIS

**EASEUS
PARTITION
MASTER 9.2.1
HOME EDITION**

Download it from
tinyurl.com/6q3gs8.

**MACRUM
REFLECT**

You'll find the software at
tinyurl.com/3zphz46.

By Gandalf's beard! Have you seen how cheap it is to pick up an SSD today? If you're not throwing solid-state boot drives into all of your systems, then either you're not saving enough of your hard-earned pennies, or you're just terrified at the prospect of reinstalling Windows.

Well, be terrified no more. Follow our step-by-step guide on these pages and we'll show you the foolproof way to clone your existing boot drive to a fresh new SSD for free. This will work with almost anything from your desktop to your laptop and includes going from a hard drive to an SSD or the other way around.

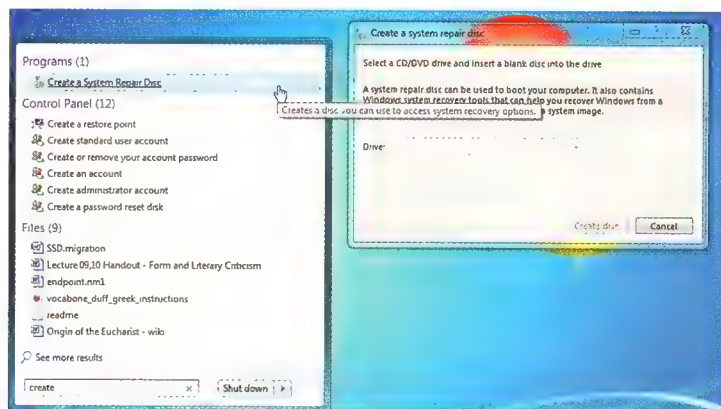
MIGRATING TO A NEW BOOT SSD

Squeeze your old Windows onto a new drive in eight easy steps.



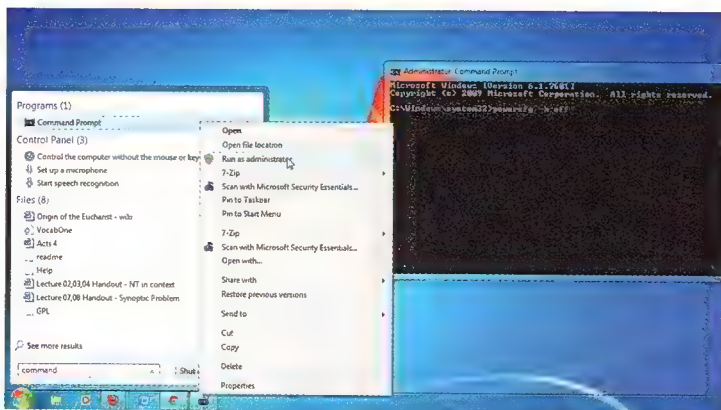
The main issue is that the new drive needs to be large enough to contain all the data on the existing boot partition. Is that obvious? Even better is if the new drive is the same or larger than the old one, although this isn't essential (it just makes life easier).

You should also remember that your system will be out of commission for some time and this isn't a quick process – if you're lucky and it all runs without a hitch, it can take less than an hour. However, if there are issues or errors, this can quickly extend to five hours or more, so it's not something to try when you're in a rush.



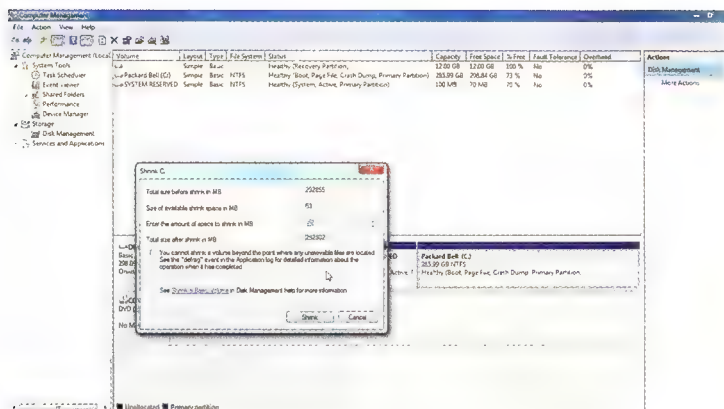
01 RECOVERY DISCS

We usually find that the newly cloned drive still needs to have its bootloader rebuilt. To do this we recommend creating a Windows emergency recovery disc (in Windows 8 it's called a recovery drive). Open the 'Start' menu, type **Create a System Repair Disc** and select it. You'll need a spare blank CD or DVD on which to burn this.



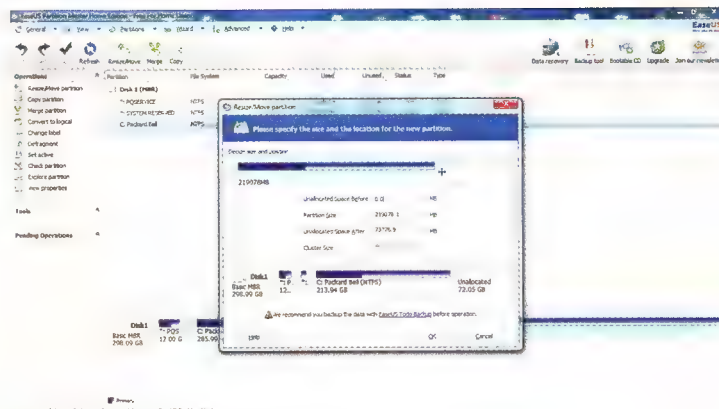
02 REMOVE EVERYTHING UNWANTED

Lucky people will have a larger new drive, but if your SSD is low on storage, remove any unnecessary programs to make some extra space. You can also remove the large hibernation file by doing the following: open the 'Start' menu, type **Command**, right-click 'Command Prompt', select 'Run as Administrator', type **powercfg -h off** and press Enter.



03 RESIZE PARTITIONS

Resizing the existing boot drive is possible. To do this right-click 'Computer' and select 'Manage > Disk management'. Right-click on the boot partition that you're going to clone and select 'Shrink Volume'. It'll calculate the amount of space that can be removed. Move on to the next step if system files are causing issues.



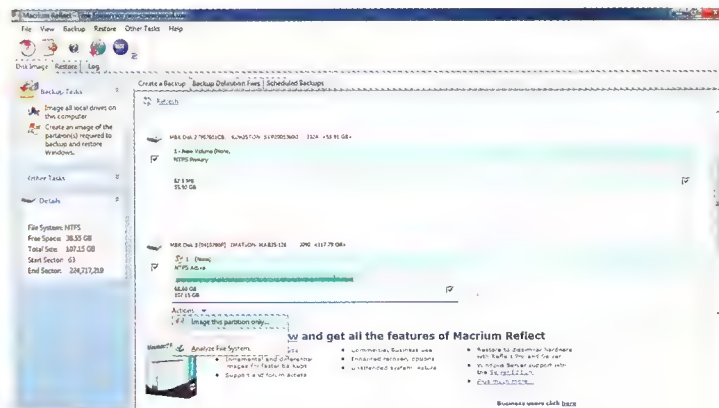
04 PARTITION SIZING

If you're having issues freeing up enough space and shrinking the partition down due to system files, you can try the EaseUS partition software. This will physically shift the data to shrink the partition. It's pretty bulletproof, although it will require a reboot into its exclusive mode.



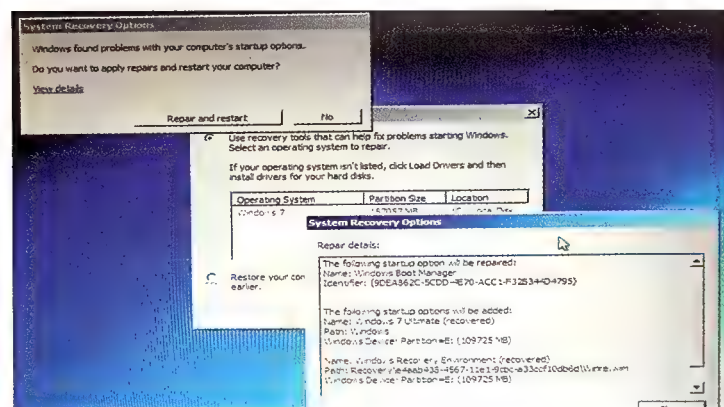
05 CONNECT THE DRIVE

We're getting close to the copy session, so hook up the new drive on a spare SATA or eSATA connection. It's easy on a desktop, but for a laptop you'll need to use a spare desktop to handle the copying. You could also use an external caddy for a laptop, ideally running over eSATA for speed reasons, plus it'll initiate the drive's driver.



06 SELECT & COPY

We prefer Macrium Reflect as our favourite drive copy solution, largely because it has a pretty interface and we're easily distracted; however, it also plays very nicely with Windows. Simply select the boot drive and then click the 'Clone this drive' link that appears, choose the destination drive and the software will do the rest.



07 RECOVER IT

Once the copy process is completed, power down, disconnect the old boot drive, permanently install the new one and then boot up your system. Whenever we've run the clone process we've always been tripped up by something. Usually Windows will get confused and want the bootloader to be rebuilt, so boot the recovery disc and let it run.



08 REBOOT YOUR SYSTEM

Any 'recovery' can be completed by the automatic system and should only take a minute to finish. When it's done, the new boot drive will be ready to run. You shouldn't see any change as it should run as an identical system, although you'll discover that it's way faster if you're upgrading to an SSD. **ERIC**

Restore your files

Need to undo changes to a file? Use DocShield to roll back to previous versions.

YOU'LL NEED THIS

DOCSHIELD

You can download the software from www.docshield.com. Note that Windows XP users also need the Microsoft .NET Framework 3.5 from tinyurl.com/a5ktxah.

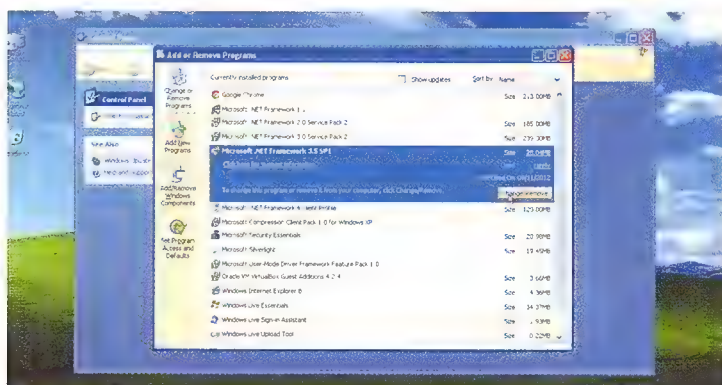
DocShield is a useful program that allows you to restore earlier versions of the same file in seconds. Never again will you have to reverse all changes made to a document, or try to remember the original draft and undo your botched rewrite. Now, you can pick an earlier revision of the file and either restore it over the current version or save it as a separate file and work on it independently. The idea of backing up multiple revisions of

a file certainly isn't new – it's even built into Windows 7 in the form of the 'Shadow Copy' feature. Many online backup tools make it possible to restore earlier versions of a file, but the key advantage of DocShield is that you're in complete control of when backups are taken and exactly which files and folders get backed up. Read on to discover how this versatile program can help protect your data in the future.



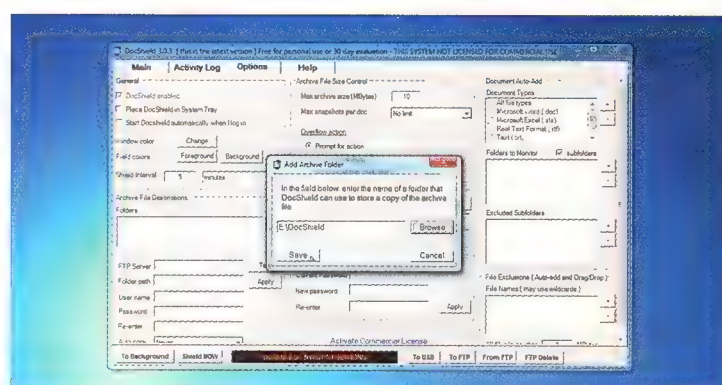
PROTECT YOUR DATA WITH DOCSHIELD

Re-rewind, when the crowd say 'Bo selecta'.



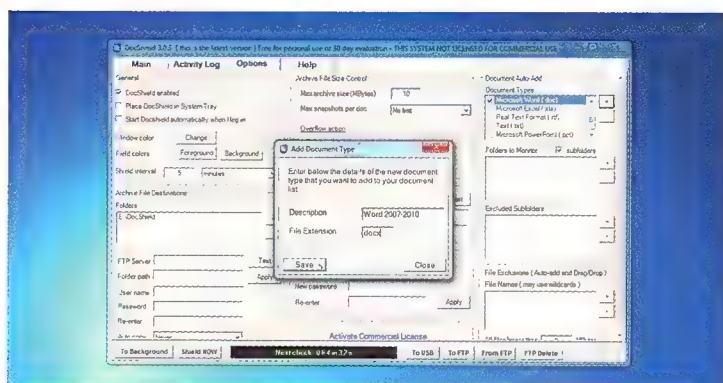
01 CHECK SYSTEM REQUIREMENTS

DocShield requires that Microsoft .NET Framework 2.0 or later is installed – it's included in Windows Vista and 7, but Windows XP users should check the 'Add or Remove Programs' applet in 'Control Panel'. If it's not there, click 'Start > All Programs > Windows Update' and perform a custom scan to download and install it. Once it's in place, install DocShield from www.docshield.com.



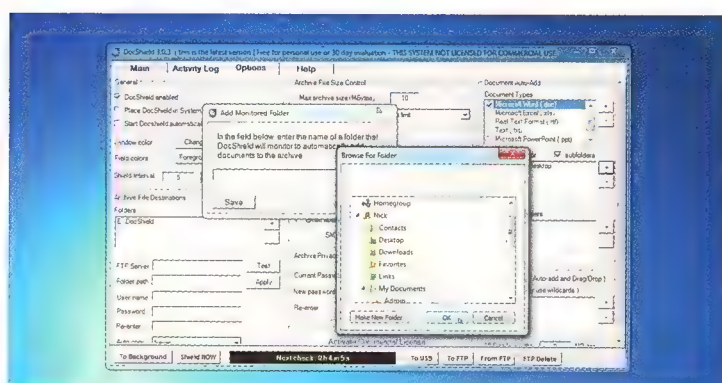
02 SET A BACKUP LOCATION

Once it's installed, double-click the DocShield desktop icon and click 'Yes' or 'Continue' when prompted. Read the warning about setting up your backup device. Click 'OK', switch to the 'Options' tab and then click the '+' button under 'Archive File Destinations', followed by 'Browse'. Select or create a suitable folder on your backup drive and then click 'OK' followed by 'Save'.



03 MONITOR DOCUMENT TYPES

Use the 'Document Add-On' section to pick specific file types to protect. To protect them, you can either tick an existing document type such as DOC or TXT, or click the '+' button to add your own. If adding your own, enter a suitable description and the file extension (minus the full stop before it) and click 'OK' – it will appear at the bottom of the list, pre-selected.



04 SELECT FOLDERS TO WATCH

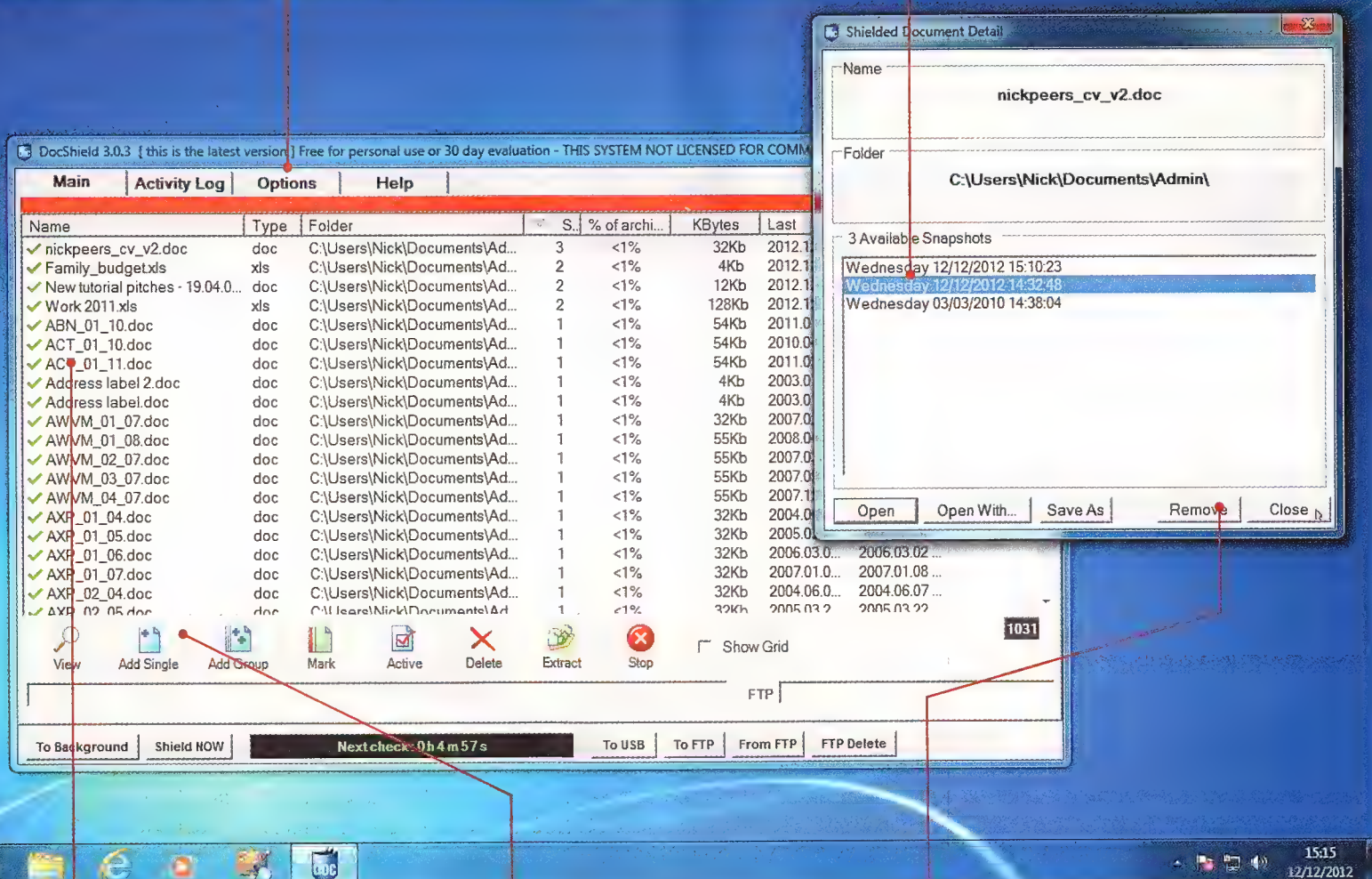
One folder ('C:\Documents and Settings') is selected by default in the 'Folders to monitor' box. This may cause error messages in later versions of Windows, so select it and click the '-' button to remove it. Now click the '+' button to select the folders containing documents with versions you wish to back up. Tick 'Subfolders' to ensure everything inside the folder is protected.

Switch to this tab to configure DocShield's options as instructed in the step-by-step guide. Examine them all carefully – you can finetune what, how and when backups are made from here.

OPTIONS

Every single snapshot of a file is listed in the 'Shielded Document Detail' window that appears when you double-click a file in the main list. Select one to do more with it.

SNAPSHOTS



FILES

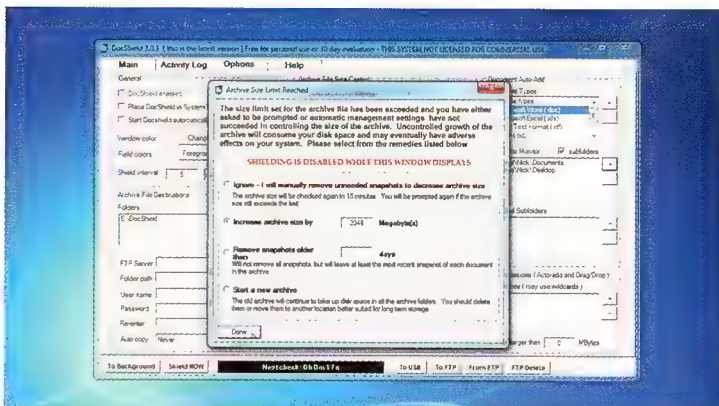
A list of all files that are being monitored by DocShield appear under the program's 'Main' tab. Use the column headings to quickly sort them according to name, file type, date or any other criteria.

ADDING

You can quickly instruct DocShield to monitor a single file or group of files by clicking one of these buttons and then selecting the file(s) you wish to add to the list.

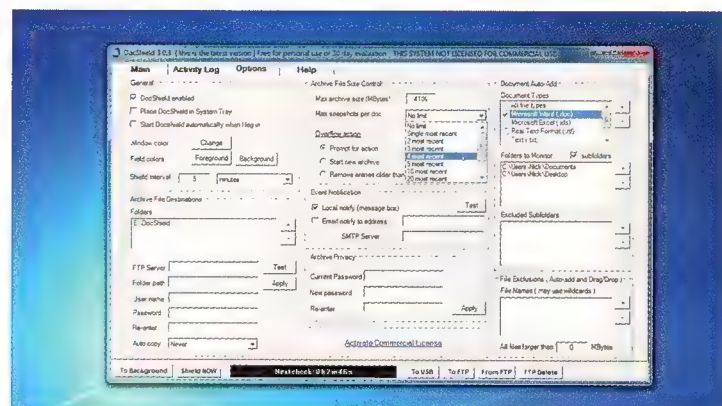
REMOVE

After a while you may find some snapshots aren't worth keeping. You can free up a bit of space by selecting an unwanted snapshot from the list and clicking the 'Remove' button.



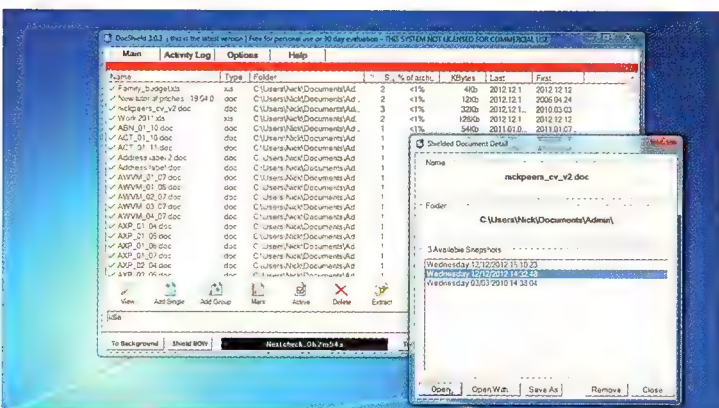
05 INCREASE ARCHIVE SIZE

By default, DocShield limits the total backup size to just 10MB, which means it'll probably be full within seconds of launching. An 'Archive Size Limit Reached' window will appear with a number of options to choose from (the best idea is to increase the size of the backup archive). Add as much space as you can spare – start with an extra gigabyte or two.



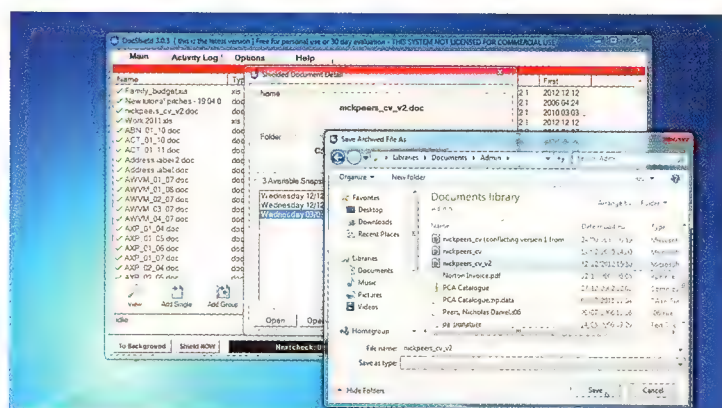
06 TWEAK BACKUP SETTINGS

By default, DocShield scans for file changes every five minutes, backing up any files that have been modified in that time – adjust the 'Shield Interval' setting to make this scan more or less frequent. Also consider limiting the number of version backups kept for each file by clicking the 'Max snapshots per doc' dropdown menu and choosing the number to keep.



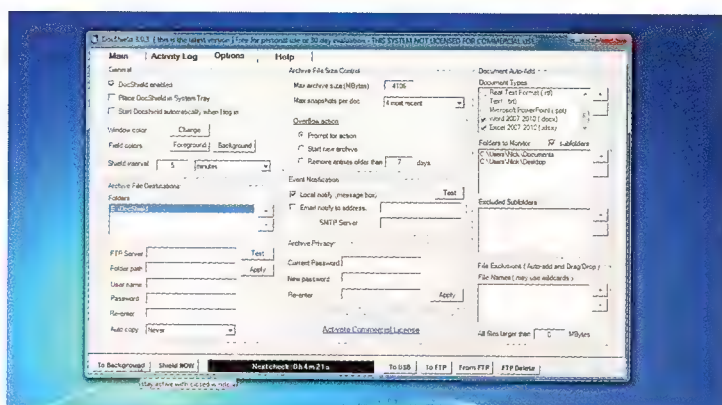
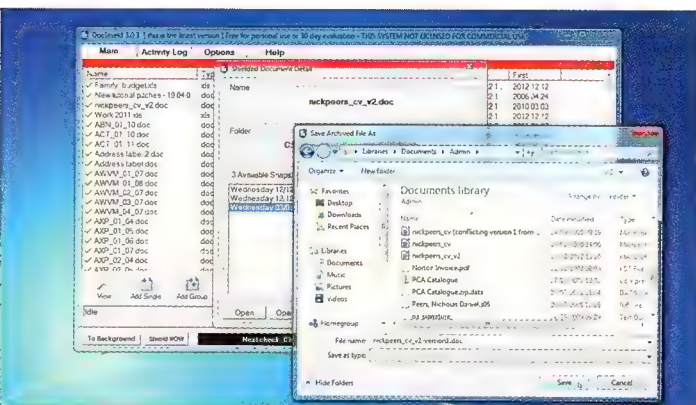
07 RESTORE AN EARLIER VERSION

When you want to restore a previous version of a file, switch to the 'Main' tab. Locate the file's entry in the list and double-click it – a window will open, listing all versions of the file that have been backed up. Select the one closest to the date or time you want to roll back to and click 'Open' to preview it in Microsoft Word or whatever its default application is.



08 REVIEW ANOTHER FILE

Once you've checked the file, click 'Close'. If it's not the right version, try another until you find the version you want, or a version close to what you're looking for. With this version selected, click the 'Save as' button. To replace the current version with this earlier revision, simply double-click its file name in the list and click 'Yes' when prompted.



09 SAVE A COPY

Alternatively, you can give the file you wish to restore a new name so it'll be saved as a copy alongside the current version. Make sure you include the file extension when typing its name – filename_v2.doc, for example – before clicking 'Save'. Once the file has been restored, you can click 'Close' to return to the main DocShield screen.

10 YOUR FILE REVISIONS, BACKED UP

Well done! You've successfully configured DocShield to not only back up critical documents and files you own, but different versions of the same file, too. That means you can happily edit a file, knowing that should the need arise, you can easily revert to an earlier copy without having to spend precious time painstakingly undoing all of your recent changes. **ETC**

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Rip & mount discs

Jon Thompson shows you how to rip and mount disc images to keep the originals safe.

YOU'LL NEED THIS

INFRARECORDER

This software is for burning ripped disc images. Download it from infrarecorder.org.

VIRTUAL CLONEDRIVE

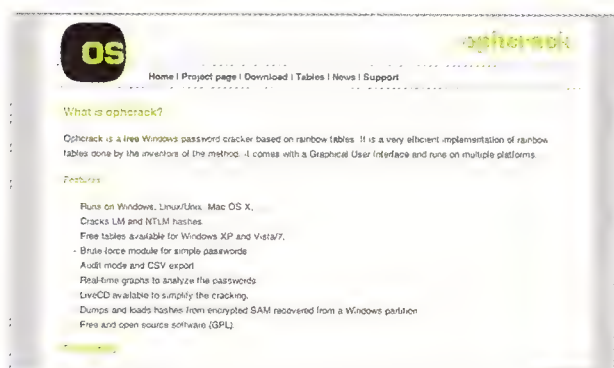
This program allows you to mount ripped disc images as virtual disk drives. You'll find it at tinyurl.com/2fqoje.

Recently, I found myself on the move with a few hours to spare. What about a nice session of my favourite game? The disc, however, which must be in the drive on my laptop for the game to play, was at home in its jewel case. What I needed was a copy of the CD on my laptop's hard drive that would be treated as the real thing.

Keeping your discs as ISO images is immensely useful, not just for the convenience of having your installation media wherever you go. If something happens to your original media – a rogue child decides to interface your keys with your copy of Microsoft Office, for example – you're covered, because you'll have a carbon copy of the original, ready to burn to another disc or mount and run straight from your PC. Backing up your media for personal use won't get you into any legal trouble either, but you obviously shouldn't distribute ripped discs.

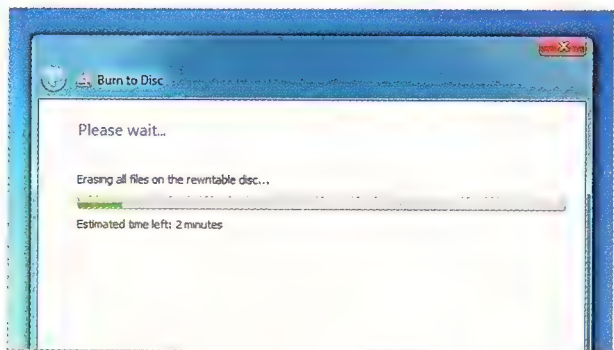
RIP & MOUNT DISC IMAGES

Take a close look at your system and identify any resource hogs.



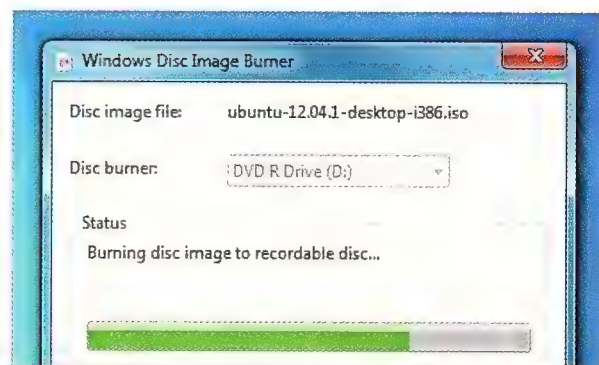
01 DOWNLOAD AN ISO

First, we need an ISO file to practise with. Let's make it something useful; the Ophcrack password recovery tool can help you out in times of inadvertent lockout, and it comes in the form of an ISO image. Download the LiveCD for your system from ophcrack.sourceforge.net and save to a convenient folder.



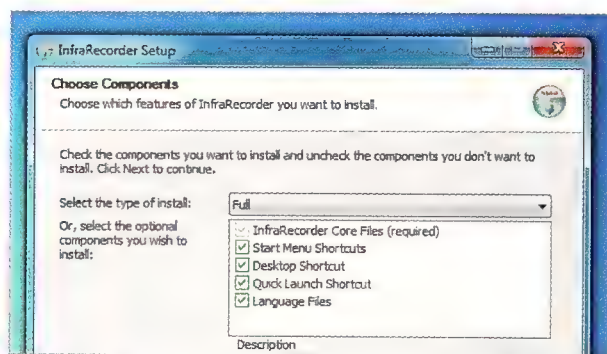
02 PREPARE A DVD-RW

Before we can use a DVD-RW for the first time, we must prepare it. To get started, put the disc in your computer's DVD drive and right-click it in Windows Explorer. If it's new, select 'Format' and click 'Start' on the subsequent window. If it's been used before, select 'Erase this disc' and click 'Next'.



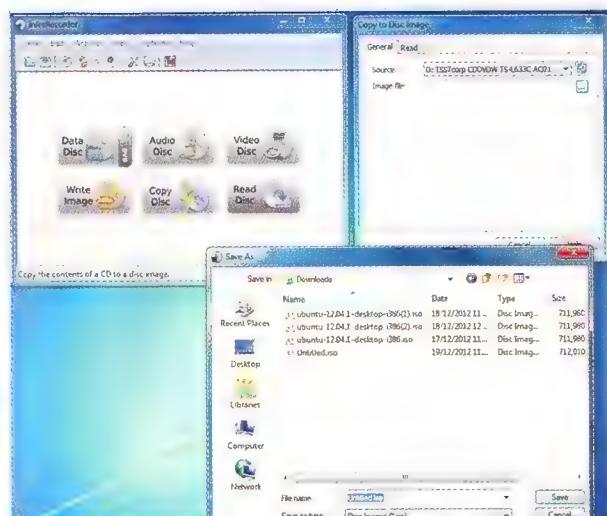
03 BURN IN WINDOWS 7

If you're running Windows 7, burning an ISO file to a bootable disc is simplicity in itself. Open Windows Explorer and right-click the ISO file in the 'Downloads' folder. Select 'Burn disc image'. Up pops the Windows Disc Image Burner. Put the DVD in the drive and select 'Verify disc after burning > Burn'.



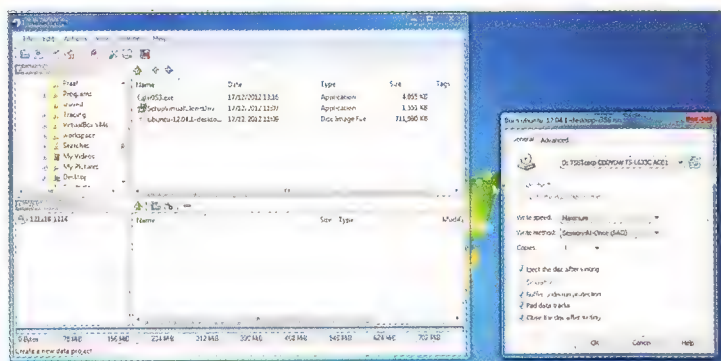
04 INSTALL INFRARECORDER

If you're using either Windows XP or Vista, download InfraRecorder from infrarecorder.org. Run the executable and select your language. Click 'Next', agree to the licence and then click 'Next' again to accept a full installation. Click 'Install'.



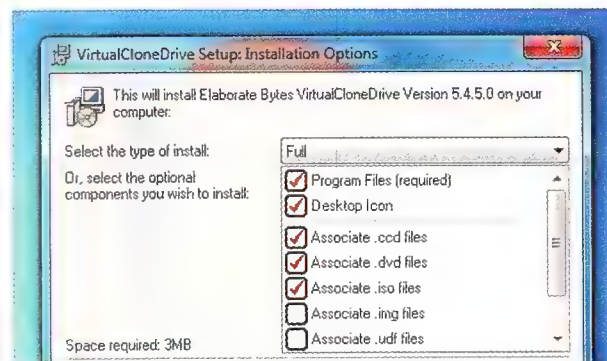
07 READING AN ISO

InfraRecorder can rip the ISO image from a disc you own to your computer's hard drive, ready to be mounted later on. To do this, click the 'Read disc' icon. Insert the disc and enter a path and name for the ISO in the 'Image file input' box. Click 'OK' and if the disc is not copy protected, InfraRecorder will create the ISO.



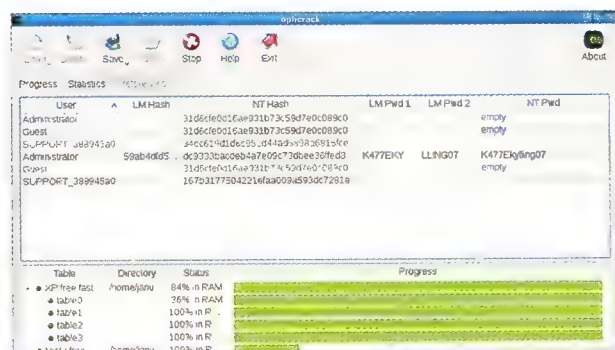
05 BURN IN WINDOWS XP OR VISTA

To burn the ISO in a version of Windows earlier than 7, first run InfraRecorder. Click 'Actions > Burn image' and select the ISO file. The default settings should be fine, so simply click 'OK' to begin burning it to the disc. This will take about five minutes, after which the disc drive should pop open.



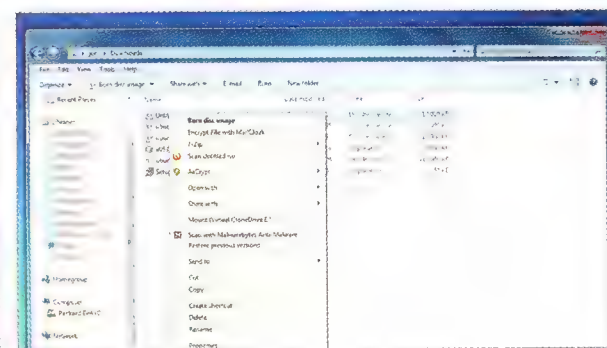
08 INSTALL VIRTUAL CLONEDRIVE

To mount the ripped ISO, we need Virtual CloneDrive, which you can download from tinyurl.com/2fqoje. Run the executable and Virtual CloneDrive will ask your permission to install a virtual device driver as it installs. Click 'OK' to agree and continue. When it's complete, click 'OK' to finish.



06 BOOT THE ISO

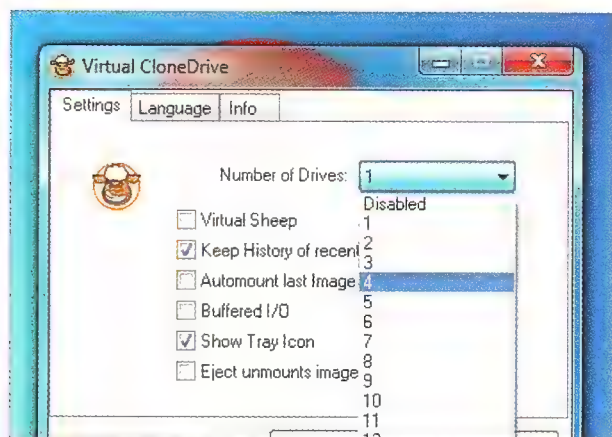
You can now test the recording of the ISO file to make sure that it will boot up. Put the disc in the drive and reboot the computer. Opncrack should load and run, eventually displaying its tools. After you've completed the boot, you can simply switch the computer off, reboot and remove the disc to go back into Windows.



09 MOUNT THE ISO

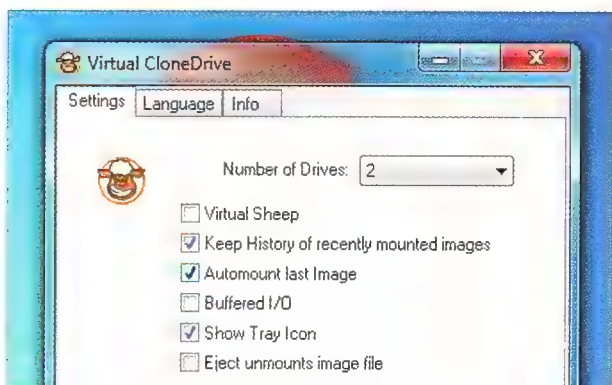
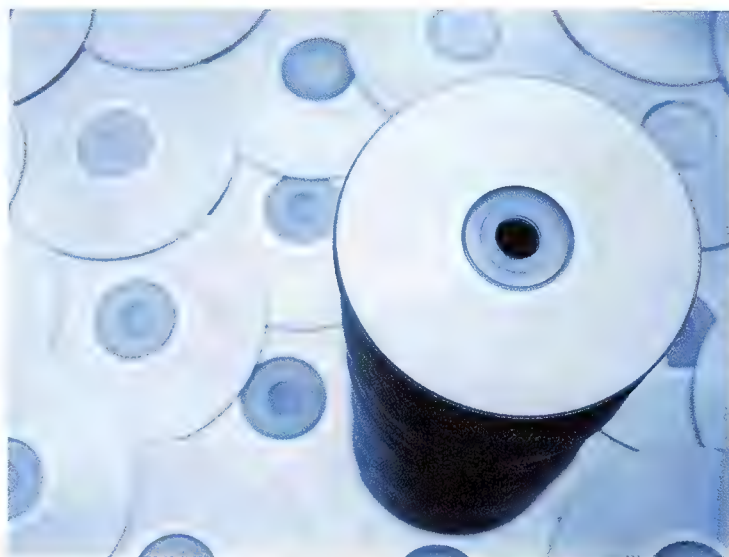
When you're ready to mount an ISO using Virtual CloneDrive, open the folder containing the ISO. Right-click the file and select 'Mount (Virtual CloneDrive E:)' After a couple of seconds a new hard disk should appear in Windows Explorer. If you expand this, you'll be able to see the files as if they were stored on a real drive.

howto ● disc backup



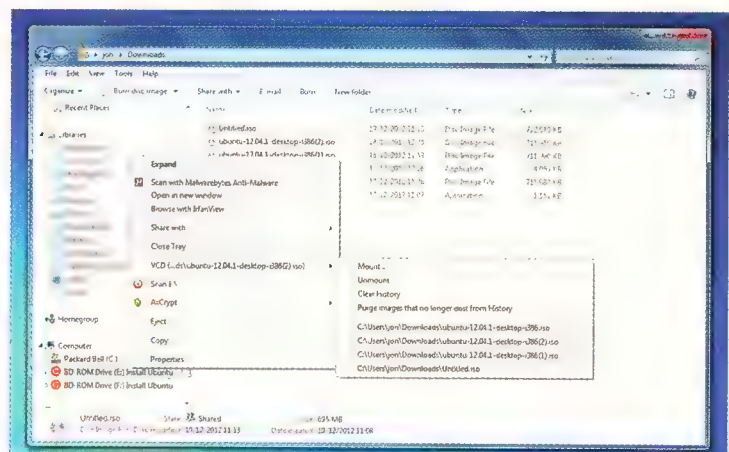
10 EXTRA VIRTUAL DISCS

Virtual CloneDrive can handle more than one virtual drive at a time. This is convenient if you have many discs that must be in the DVD drive before their associated apps will work. Virtual CloneDrive also adds an icon to the system tray. Right-click it and select 'Settings'. Use the pull-down list to select the number of drives you need.



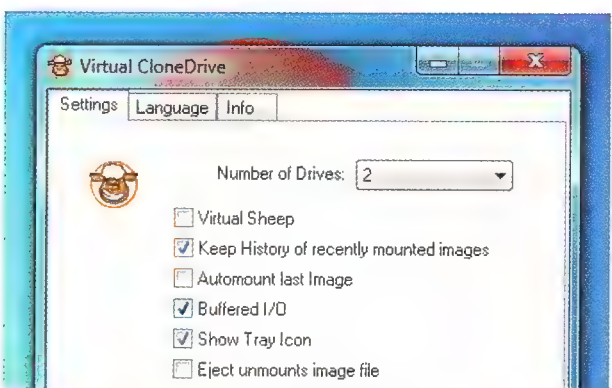
11 AUTO-MOUNT IMAGES

It's easy to forget to mount your images before attempting to use them. To avoid this situation, Virtual CloneDrive has a great feature that will automatically mount the images you currently have mounted the next time Windows boots up. To do so, right-click the system tray icon, select 'Settings' and ensure 'Automount last image' is selected.



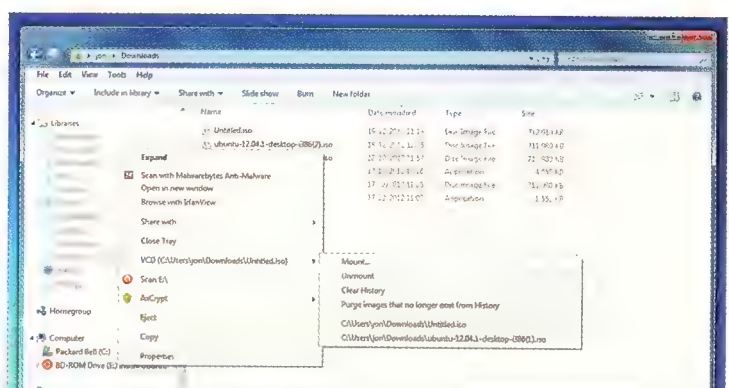
13 SWAP MOUNTED ISOS

As a convenience, if you've previously mounted an ISO, you can quickly re-mount it in place of a currently mounted image. To do so, right-click the virtual drive and rest the mouse over the 'VCD' entry. At the bottom of the sub-menu is a list of previously mounted images. Select one and it will be mounted in place of the current image.



12 IMPROVE NETWORK PERFORMANCE

If you store your data on a dedicated server, you might notice a serious degradation in data access times for the image. This is because the data isn't buffered on your computer by default. To change this, right-click the Virtual CloneDrive icon, select 'Settings > Buffered I/O'. Re-mount the image to continue.



14 UNMOUNT IMAGES

It's also useful to be able to unmount virtual drives as you go. You can do this by right-clicking the mounted virtual image in Windows Explorer and selecting the entry on the menu that begins with 'VCD' followed by the path to the image. On the sub-menu, click 'Unmount'. After a few seconds the drive should disappear. **BTTC**

Internet remote desktop

Neil Mohr stretches the reach of your system across the globe.

YOU'LL NEED THIS

WINDOWS RDP

In order to get Windows Remote Desktop Protocol working securely over the internet, you'll need the correct version of Windows: Pro, Business, Ultimate or Server.

What's Windows Remote Desktop Protocol (RDP)? It's the service that enables you to log into a networked Windows PC remotely as if you were sitting right in front of it. It's a great tool for accessing headless servers, or just for the lazier among us who can't be bothered sorting out gran's PC issue in the other room.

It's great because it's a standard part of Windows and it's super-fast. Although VNC is good enough for some circumstances, it works by effectively capturing and then streaming the entire desktop image. On the other hand,

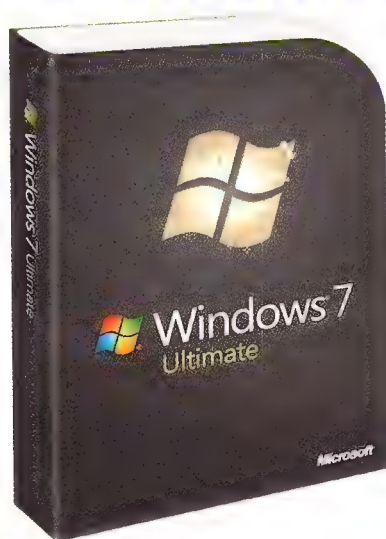
Windows RDP can get away with capturing just the underlying data structure to recreate the Windows desktop locally.

More importantly, Windows RDP ties into the existing Windows Groups and User system. This means it can be made pretty secure, as you can restrict access to an RDP user who's connecting over the internet. It features 128-bit encryption, redirection of the clipboard, audio and a host of other devices.

All in all it's pretty funky. There are some restrictions on the versions of Windows that can instigate an RDP server, but any version can access a server once it's running.

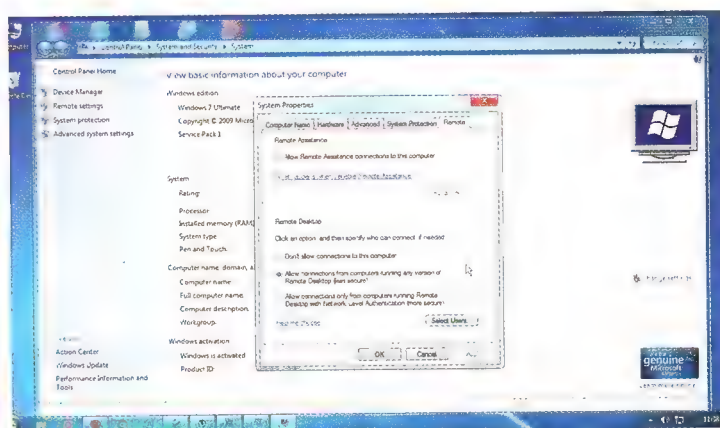
REMOTE DESKTOP ONLINE

Create a secure Windows RDP connection over the internet.



01 WHICH VERSION OF WINDOWS?

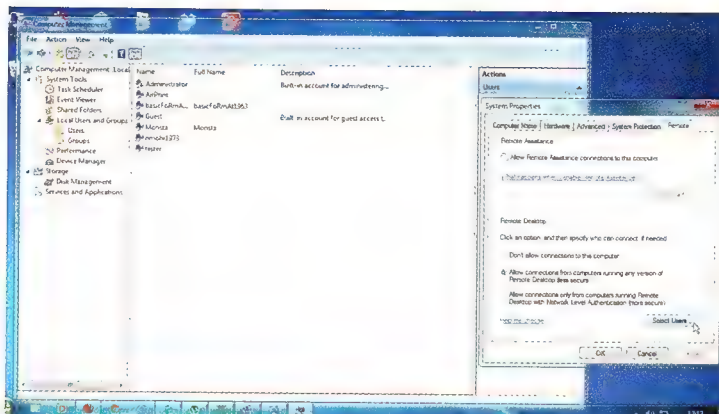
You can use any version of Windows to connect to a PC running Windows' RDP service. The issue is that generally only the Pro, Business and Ultimate versions offer the Windows RDP host service. If you're running an edition of Windows Server you're also good to go, but be aware that only one user can be logged in at a time.



02 ENABLE RDP ACCESS

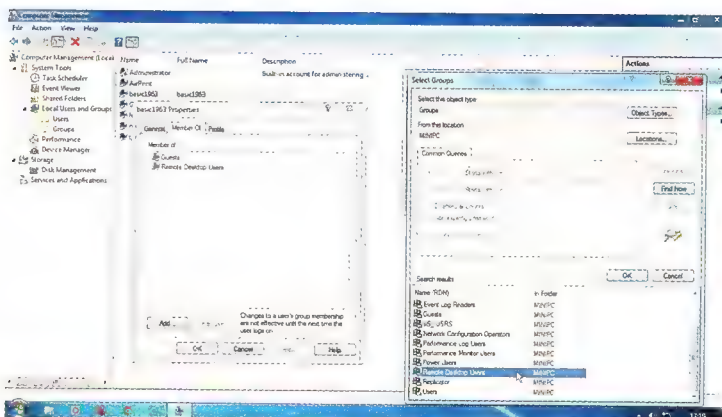
Before starting anything we need to set Windows so it'll accept Windows RDP connections. Right-click 'Computer' in the 'Start' menu and select 'Properties > Remote settings'. In the 'Remote Desktop' section, select the middle 'Allow' option. The last option will enhance security, but you need the latest Windows updates.

howto remote desktop



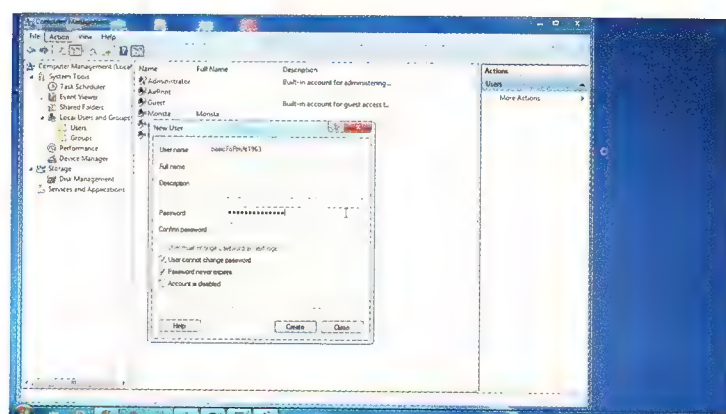
03 CREATE A USER

You'll notice the 'Add' button on that last dialogue box. Use this to add existing users for remote access, but for security over the internet, consider creating a dedicated user account with restricted permissions. Right-click 'Computer', select 'Manage > Local users and groups > Users' and then 'Action > New user'.



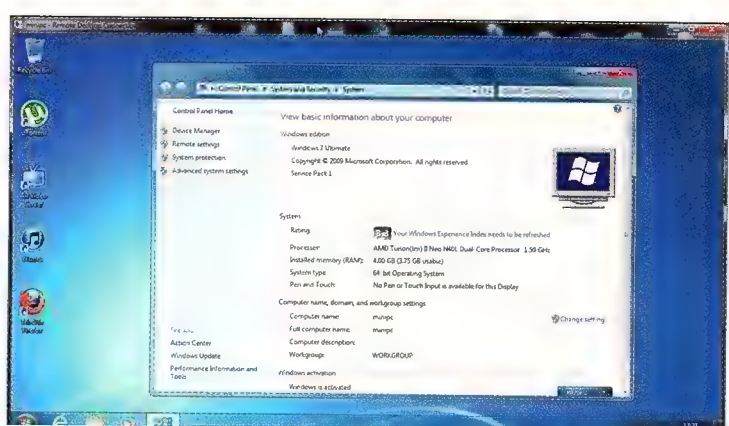
05 SET PERMISSIONS

Create the new user, double-click the entry and select 'Member of > Add > Advanced > Find now > Remote desktop users'. This user now has RDP privileges. You may want to remove this from any other user accounts. You can also remove them from the Users group and add them to the Guest group for restricted access.



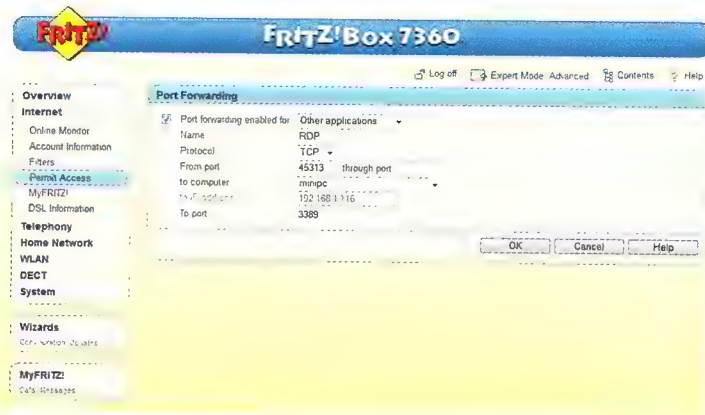
04 STRONG PASSWORDS

Anyone can potentially access this over the internet, so choose a complex username with a number and some caps, and a strong password. A long, memorable password is better than a short random one, or a short word with a number and capitalisation. Deselect the 'Change' option and tick 'Cannot change'.



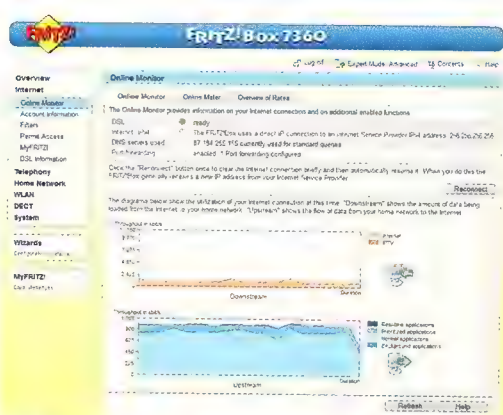
06 KEEP IT LOCAL

You should now check that RDP and the new user account are working. Jump on another PC or RDP client and try to log in over your home network. Click 'Start', type Remote Desktop Connection and run it, or find it in the 'Programs > Accessories' folder. Enter the remote PC's name or IP address to get going.



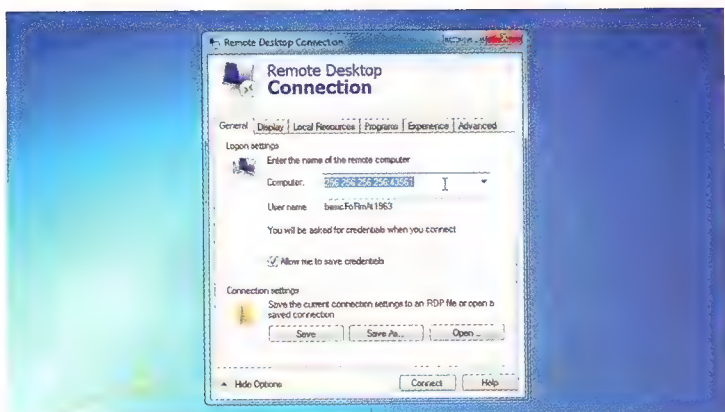
07 PORT FORWARDING

Windows RDP server works over TCP port 3389. For added security we'll connect to the router over the internet to a randomly selected port, making it harder to hack. The available range of general ports is from 1024 to 65536. Depending on your router, configure it to forward that port to the IP of your PC and to port 3389.



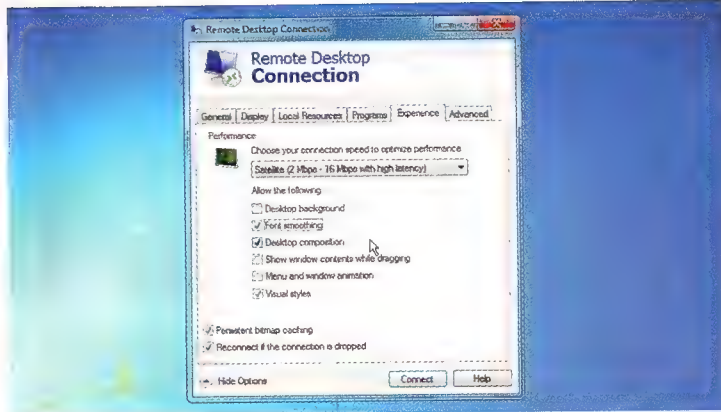
08 GET THE INTERNET IP

This depends on your broadband router, but somewhere in its interface you'll find the external IP address your ISP has assigned to your router. Try looking in the 'Logging' or 'Internet' section. You can Google 'What's my IP?' and the search engine will tell you. If you don't have a static IP, then you'll need a DDNS service.



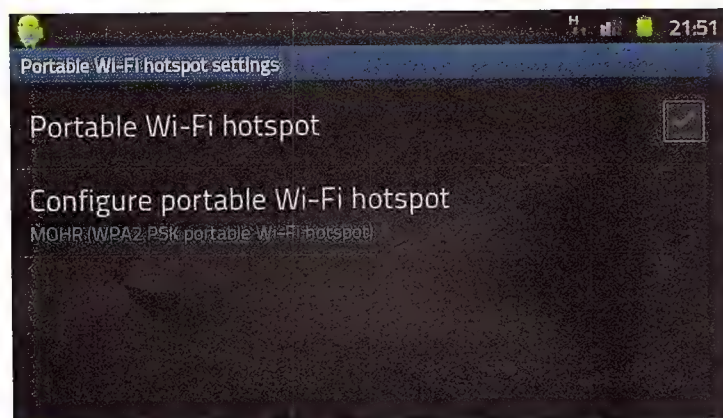
09 CREATE AN RDP PROFILE

How do you connect to a remote desktop that's using its own port with the Remote Desktop Connection program? Under 'Computer' you need to enter the external IP of your router, followed by a colon and then the port number – all with no spaces. Press the down arrow and you can also add the username, ready to log in.



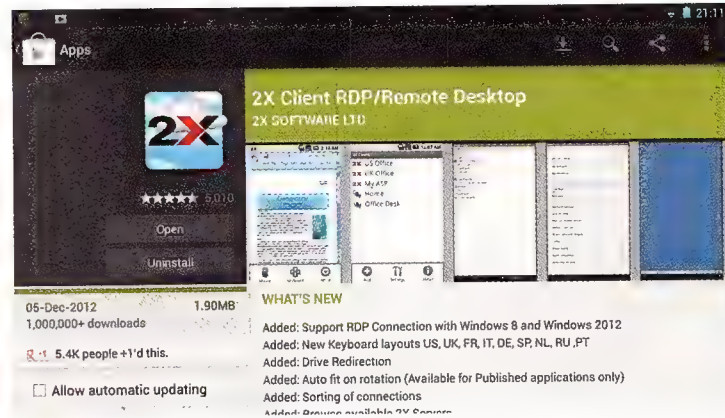
10 OPTIMISING CONNECTIONS

Click the 'Experience' tab to see how you can speed up your remote desktop experience. You can leave all the options off, but 'Visual Styles' and 'Desktop Composition' don't slow things down too much. Under 'Display' you can select a smaller resolution and reduce the colour depth.



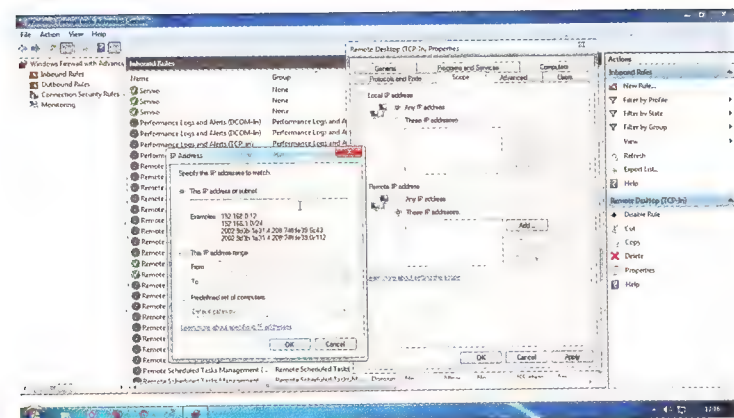
11 MOBILE PHONE TESTING

To really test this out, you'll need access to a connection outside your own home network. For many, the easiest option is to fire up your smartphone and use it to create a wireless hotspot or access the remote system from it directly. Bear in mind that this will connect via the mobile network, so data charges may apply.



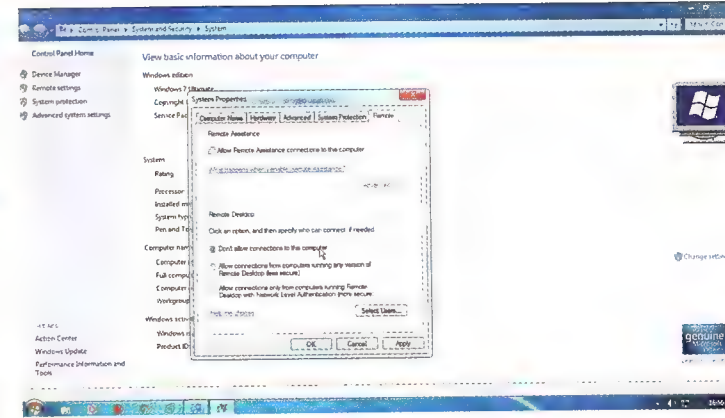
12 ANDROID & IOS

So far we've only talked in terms of access from other Windows systems. The situation is that Windows RDP clients exist for all systems including Android and Apple iOS. Search for 2X Client, which is a free app supplied by an RDP vendor. It's an excellent choice – configure it just the same as the Windows one we've covered.



13 FIREWALL RESTRICTIONS

Windows Firewall is comprehensive and you can restrict RDP access to systems from specific IP addresses. If you know these details, it can be a really secure option. Click 'Start', type 'Firewall' and select 'Windows Firewall with Advanced Security'. Select 'Inbound rules > Remote desktop > Scope' and set the IP here.



14 REMOVING ACCESS

If you no longer need external access, there's a level of tidying up that will secure your system again. First, remove the forward port from the router. Second, remove remote access privileges or remove the user from the system entirely. Finally, if you don't plan to use it, you can remove remote access, reversing step 2 entirely.



PART 8

Animating the web

In this month's instalment of our HTML5 masterclass, **John Allsopp** introduces the creation of simple animations using CSS3.

APC EXPERT

JOHN ALLSOPP

With a background in computer science and mathematics – and a great deal of good fortune – John Allsopp's life collided with the web in the early '90s. For nearly 20 years he has developed software for web developers, built web sites and apps, and written books, countless articles and tutorials for print and online publications. In 2000, he wrote *A Dao of Web Design*, which over a decade later continues to be widely cited as the theoretical foundation for Responsive Web Design.

For a screen-based medium, the web has long been remarkably static. Regardless of where we move our cursor (or these days, tap and drag), little on most web pages will change. The browser itself will provide a range of 'affordances' (most commonly, changing the cursor based on what it's hovering over or where it's focused) and web developers will commonly change the state of a 'hit target' as well (background colours may change on a link when the user hovers over it). That's typically the extent of the dynamic nature of the web.

However, as the web of pages makes way (at least in part) to a web of more application-like experiences, animated interfaces are becoming more common. In the past, we'd have had to use Flash or a similar plug-in technology to achieve sophisticated animations. Now, we can now do so in all modern browsers and devices, including Internet Explorer 10 and up, using just CSS3.

What makes this approach so appealing is that we can use it in a way that non-supporting browsers will still work fine, albeit without the animated effect. Where support in older browsers is absolutely required, with a little extra work we can use JavaScript to emulate most animations we can achieve with CSS3.

SIMPLE & COMPLEX ANIMATIONS

CSS3 provides two ways of animating web content. In this instalment, we'll focus on the simplest approach, CSS transitions, which make it very straightforward to animate changes in the style of an element. Next time, we'll look at CSS animations, which allow us to make keyframe animations using only CSS, without the need for JavaScript.

Since the arrival of JavaScript in the browser nearly 20 years ago now, we've been changing the state of web pages (for example, changing background colours and images) based on user interactions such as when a user clicks or hovers over a link. In fact, this was just about *all* people did and could do when JavaScript was introduced.

A little while later, in the latter part of the 1990s, dynamic CSS selectors (like `a:hover`) meant we could change the appearance of an element based on its state without the use of JavaScript. However, these changes (the *transition* of the appearance) was abrupt, rather than smooth. For example, a solid background colour changed dramatically, not smoothly.

The rise of JavaScript libraries such as jQuery in the middle 2000s made animation popular, but had some significant drawbacks:

- Their use required competence with JavaScript and specific libraries.
- Adding these libraries to web pages made them typically much slower to download.

These animations were computationally intensive, meaning an impact of page performance and potentially battery life.

JavaScript-based animations became something of a hallmark of 'web 2.0' sites and demonstrated that there was a demand for web-based animation. Then Apple, with WebKit, the engine at the heart of Safari (and Google Chrome, and the iOS and Android default browsers, and now many other browsers including that found in BlackBerry devices) introduced CSS-based animation.

TRANSITIONS: ONE-STEP ANIMATIONS

Using either CSS or JavaScript, we can change the appearance of elements in a web page. The simplest way is to use CSS, something like this:

```
a:link {
    background-color: red;
}

a:hover {
    background-color: blue;
}
```

We can do this with JavaScript along the following lines:

```
var element = document.querySelector("#intro");
element.style.backgroundColor = "blue"
```

Note that directly changing the `style` property of an element using JavaScript generally isn't the best approach to manipulating style.

Of course, both of the above approaches have worked for many years and as we know, what we'll get is an abrupt transition between background colours. But now, what we can do is define a `transition` property using CSS, which specifies how these changes in style should be animated by the browser. A CSS transition requires us to specify:

- Which property changes should be animated.
- How long these animations should take.
- Optionally, the animation style.
- Optionally, a delay that should take place before the animation commences.

WHICH PROPERTY IS ANIMATED?

We can choose to animate only a specific property to animate when that property changes, a number of properties or even all properties. We use the `transition-property` CSS property to do this. For example:


```

a:link {
    transition-property: background; /*only the background
property change will be animated when it changes*/
}

p {
    transition-property: color, font-size; /*only the color and
font-size properties will be animated when they change*/
}

h1 {
    transition-property: all; /*any animatable property will be
animated when it changes*/
}

```

This won't yet cause our property changes to animate. For this we also need to specify at least the duration of the animation; by default it's 0, which is why there's no perceivable animation.

We specify this duration using the `transition-duration` property. We specify the value as either in seconds `s`, or milliseconds `ms`.

```

a:link {
    transition-property: background; /*only the background
property change will be animated when it changes*/
    transition-duration: 1s; /*the background color change will
be animated over a second*/
}

p {
    transition-property: color, font-size; /*only the color and
font-size properties will be animated when they change*/;
    transition-duration: .5s, 100ms; /*the color change will be
animated over half a second, while the font-size change is animated
over 100 milliseconds*/
}

h1 {
    transition-property: all; /*any animatable property will be
animated when it changes*/
    transition-duration: 500ms; /*any animatable property
changes will be animated over half a second (500 milliseconds)*/
}

```

It's worth noting that where we specify a comma-separated list of properties to be animated, we can either specify a single duration for all of them, or a comma-separated list of duration values, if we want different properties to have their changes animated for different periods of time.

Then we have elements whose property changes will be animated. There's one more thing we may want to add to our transition: a style of animation or more technically, a `transition-timing-function`. This function specifies how the transition takes place. Will the changes take place so that each step of the animation is identical in length (this is a `linear` transition)? Will the animation begin quickly and slow down toward the end (`ease-out`)? Or the opposite, starting slowly and ending quickly (`ease-in`) among others. We specify these using the rather awkwardly named `transition-timing-function` property. By default,

animations have a timing function of `ease`, where the animation accelerates to a maximum speed and then slows toward the end.

In most cases, you won't need to specify a timing function, but if you do, you'll know where to look.

GOTCHAS

As with all new web technologies, there are some gotchas to be aware of. Not every property of an element is animatable, though most of those you'd expect to be are. One property you might expect to be animated when changed is `background-image`. According to the specification, however, `background-image` isn't animatable. However, WebKit-based browsers *do* support transitions on elements when their background images change, though this support is far from perfect.

We've seen the issue of browser prefixes in previous instalments. Because transitions still aren't a final W3C specification, some browsers require a prefix to support them. Luckily, since most browsers don't require this prefix, we really only have to add one prefixed version for WebKit-based browsers. So, in addition to `transition`, `transition-duration` and possibly `transition-timing-function` properties, we'll also want to specify (with the same values as the corresponding unprefixed properties) `-webkit-transition`, `-webkit-transition-duration` and `-webkit-transition-timing-function` properties.

When specifying transition properties, we want to specify them for the default state of an element. For example, if we specify transitions on the hover state of an element, then the animation will only take place when the element is in the hover state. That means we may have a transition when the user hovers over the link, but no corresponding animation when the user moves the mouse away from it. This is an extremely common first-timer's mistake (speaking from personal experience), so be aware of it.

BACKWARDS COMPATABILITY

Transitions are an ideal candidate for the 'progressive enhancement' approach to web development. Where browsers don't support them, the user simply has a more abrupt transition when a property changes. There may be rare cases in which animation is required; for example, a game using transitions may be unplayable if elements jump dramatically from one location to another, rather than smoothly moving along a path. In most cases, though, the user of less capable browsers has the experience they always would have.

Where a transition is absolutely required, even in non-supporting browsers, there are JavaScript libraries that will emulate transitions. Note that this approach will have potential negative impacts as we outlined earlier, but it's an option. I'd counsel against using this approach without a very good reason. Remember, web sites don't have to look identical on all browsers and platforms.

If you want to play with transitions yourself, here's a fully functioning starting point:

```

a:link {
    -webkit-transition-property: background-color;
    transition-property: background-color;
    -webkit-transition-duration: 1s;
    transition-duration: 1s;
}

```

NEXT TIME

In the next instalment, we'll look at how we can use CSS animations to create more complex keyframe-style animations. While you might be wondering when you'd ever possibly need these, you'll be surprised at how useful it can be for quite common user interface elements, such as 'Loading' spinners. So enjoy exploring CSS transitions, though perhaps try to not overdo them. [ETIP](#)

Play back audio

Darren Yates explains how to build an Arduino-powered digital audio player that plays WAV files from an SD card, all for less than \$40.

PROJECT 5

Digital audio player

APC EXPERT

DARREN YATES

Darren is a multi-award-winning journalist who started building and testing computers in the early '90s. He's developed a range of PC software, including PC User's UserBench benchmark series starting in 2005, its UserOS Linux distros in 2008 and is now working on new benchmarks for Android when he's not busy writing or torturing hardware with his soldering iron.

So far in this series, we've had a diverse look at how Arduino can interact with a range of real-world devices from servo motors to ultrasonic range finders, TVs to humidity sensors. Last month, I signed off our Arduino masterclass by saying we'd be back to see if we could get the Arduino to make a few sounds. We'll actually do a bit better than that – we'll look at the importance of pulse width modulation (PWM) to microcontrollers by building our own digital audio player called Auduino.

WHAT WE'RE BUILDING

A couple of months ago, I stumbled across a simple single-button digital audio player based around a Raspberry Pi developed by a guy for his 90-year-old grandmother who needed something simple to use (tinyurl.com/a32quzk). All it had was a single button and an LED, and it was programmed to play digital audiobooks. The button pressed quickly would pause and play, while holding it down for more than four seconds would play the previous track.

I couldn't help wondering if we could do something similar and simpler with an Arduino. Well, you can. We've combined an Arduino Uno microcontroller, a \$1.50 SD card reader module from eBay, computer speakers and some other components to create a simple single-button digital audio player. There'll be a small amount of soldering involved.

Admittedly, our player's WAV file support is modest (mono, 8-bit, up to 19kHz), but the quality is still more than good enough to handle music and digital audiobooks. However, don't miss the bigger picture – an audio player we can digitally control opens up a world of possibilities.

A digital audiobook player using a Raspberry Pi.

FIND FREE AUDIOBOOKS

Looking for free downloadable digital audiobooks? Try LibriVox (librivox.org) and Books Should Be Free (www.booksshouldbefree.com). These are usually in MP3 or OGG format, with books separated into chapter files. Our encoder can easily turn these into the necessary WAV format.

MAKING THE WAV FILES

If you're wondering where you'll find 19kHz/8-bit/mono WAV files, we've got that covered. I've created an easy-to-use audio converter that integrates into Windows Explorer and converts any audio file into the required WAV format. You can even convert multiple files at the same time and it automatically turns those files into the 8.3 filenames our player requires. All you do then is copy the WAV files to the root of a FAT32-formatted Class 4 SDHC card (we've tested cards up to 8GB). Load the card into the player's SD card reader module, press the button and the first track will begin playing.

HOW IT WORKS

The ability to turn digital data – 1s and 0s – into a proportional analogue voltage is a fundamental tenement of digital audio and it's where the digital-to-analogue converter (DAC) gets its most celebrated use. Audio DACs appear in every smartphone, tablet, MP3 player, PC and laptop. They're everywhere. DACs are also used to control motors and sensors, LEDs and more – anywhere where you need to turn a digital number into a real-world analogue voltage. One of the simplest ways to do it is what makes microcontrollers so popular – it's called Pulse Width Modulation (PWM).

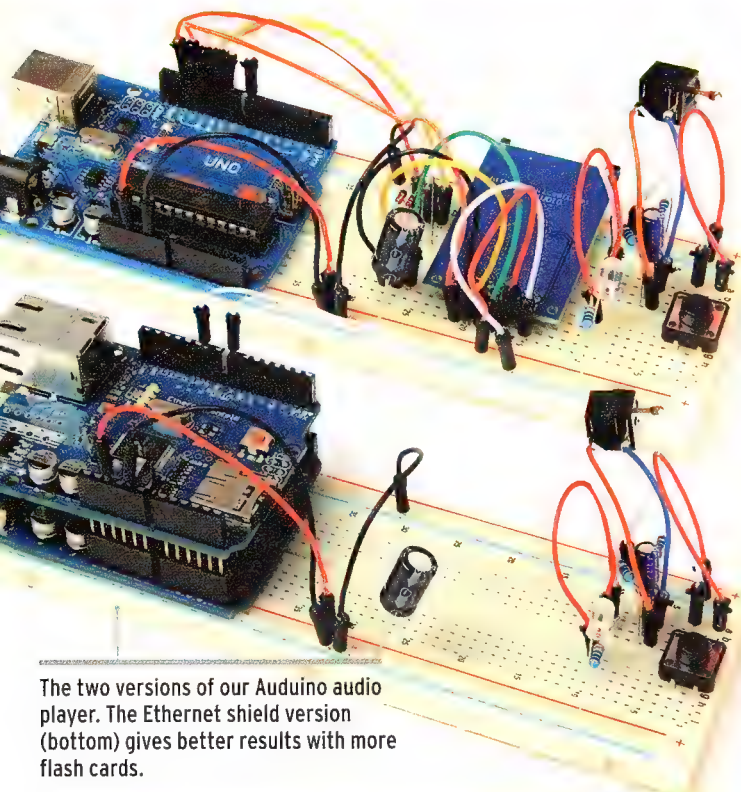
The problem for all microcontrollers is that their standard digital outputs only have two positions: high and low. The output will either be at the supply rail (Arduino's 5V) or ground (0V); there's no in between. This is where PWM comes in. It starts with a clock signal output that runs at a much higher rate than we need; in our case, beyond the 20kHz audio spectrum. That clock signal is a squarewave, meaning it spends half the time at digital-1 and half at digital-0 in each clock cycle. In geek speak, we say it has a duty cycle of 50%.

What PWM allows us to do is modulate that duty cycle so that when its pulse waveform output is fed and filtered through a particular device, the waveform is averaged and becomes an analogue voltage that's proportional to the duty cycle. So, if the waveform signal varies between 0 and 5V and has a 10% duty cycle, it'll have an average analogue voltage of 0.5V. At 50% duty cycle, it'll be 2.5V; at 90%, it'll be 4.5V.

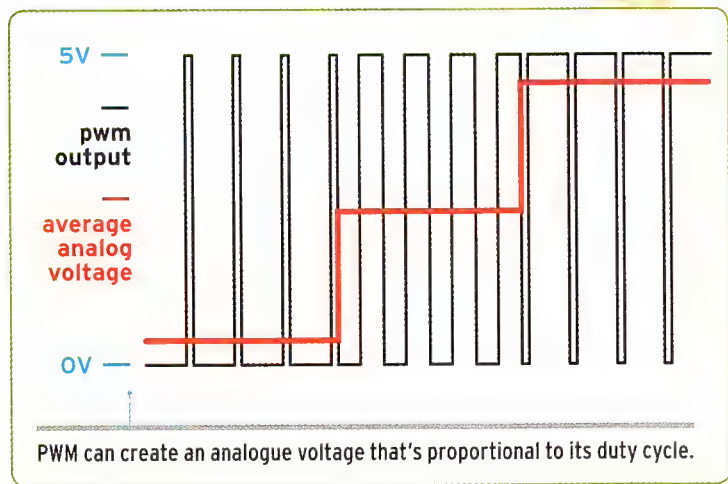
This is how the pulsating LED on your iPhone or iPad works. The LED will be fed with a PWM waveform that varies between 0 and 100% duty cycle at a high enough frequency so you can't see the LED flashing.

Your typical music file is the result of the reverse process: turning a complex analogue voltage into a digital representation. Audio CDs capture two channels (stereo) at a





The two versions of our Arduino audio player. The Ethernet shield version (bottom) gives better results with more flash cards.



44.1kHz sample rate with 16-bit resolution. What that means is there are 2^{16} or 65,536 distinct voltage levels that can be captured every 22.6 milliseconds or so.

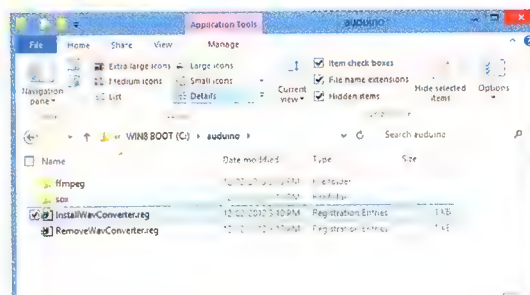
It's called Pulse-Coded Modulation (PCM) and it's the basic format used by Windows' WAV file format. Look at a WAV file and you'll see a long series of 16-bit numbers that represents the audio (one per sample and one per channel). Turning those digital samples back into an analogue voltage is what every audio player does.

One way of doing this happens to be PWM. Remember how we said before that a PWM signal is modulated to create a variable duty cycle waveform? Guess what we use to modulate the clock signal with? The digital audio samples from our WAV file. So what we end up with is a PWM waveform output whose duty cycle is proportional to the PCM audio data in the WAV file. We feed the output into an audio amplifier and hey presto! We hear that digital audio WAV file coming through the speakers.

ARDUINO LIMITATIONS

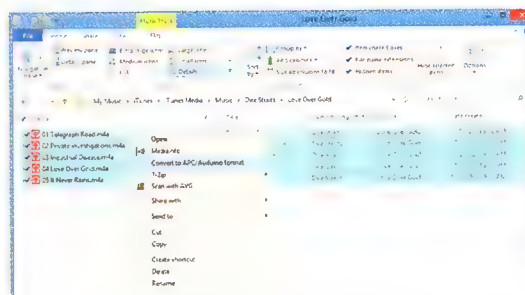
While we love Arduino, this is where we run into its limitations – it only has an 8-bit bus and combined with its limited 16MHz clock speed and our audio code library, we only have enough speed to handle WAV files with a 19kHz sample rate and 8-bit depth. That said, I've worked on our simple audio converter to tweak the encoding so it produces good-sounding files with a better than AM radio frequency bandwidth, which is good enough for music and certainly more than enough for digital audiobooks.

CONVERT ANY AUDIO FILE INTO 'AUDUINO' FORMAT



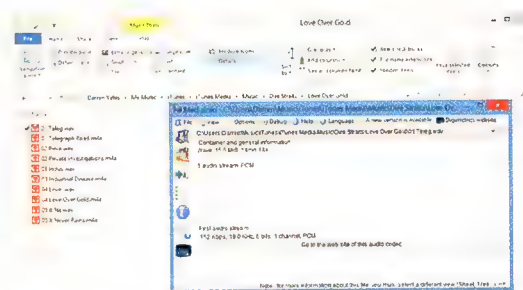
01 DOWNLOAD AUDUINO

Download the 'auduino.zip' file from apcmag.com/arduino.htm and unzip it to the 'C:\Auduino' folder on your C: drive. Launch the 'InstallWavConverter.reg' file. This installs a Shell registry key that adds a new menu entry to Windows Explorer's context menu. (Open the REG file in Notepad and you can see how it works.) Click the 'Yes' button to confirm and then 'OK' when it's completed ('RemoveWavConverter.reg' deletes the registry key if you wish).



02 CONVERT AN AUDIO FILE

Use Windows Explorer to find an audio file you wish to convert, right-click the file and select 'Convert to APC/Auduino format'. You'll see a Command Prompt screen appear briefly and when it disappears, you'll have a new WAV file in the original file's location. You can even select multiple files to encode all at once.



03 TRANSFER & PLAY

Copy this file(s) to the root folder of a Class 4 FAT32-formatted SD card up to 8GB and transfer the card to the Auduino player. Files can be up to 2GB. Power up the player and press the button.

Building the Auduino

We're building our prototype this month on the same breadboard we used for our LED dice and weather station projects, as it makes it easier to troubleshoot and program the Arduino. You can see how it goes together from the circuit diagram, the overlay diagram and the photos. The SD card module has two rows of pins and each pair is wired together so it can plug straight into the breadboard.

VOLTAGE LEVEL TRANSLATION

If there's a tricky part of the circuit, it'll be the diodes connecting the Arduino to the SD card module. It may look like the diodes are facing the wrong way, but they're not. We've got a small problem in this project that the diodes are helping to fix for us. Basically, the Arduino runs on a 5V logic level (that means the digital outputs swing from 0V to 5V), but SD cards only run on 3.3V. If we feed 5V into the data lines of the SD card module, we risk blowing up the card.

The diodes therefore act as a voltage level translator. The SD card module has pull-up resistors on three of the four data lines, which lightly connect these lines to the supply rail. When the Arduino digital output swings low, the diodes are forward-biased by the current through the pull-up resistor and the SD module control line drops low to 0.6V. When the Arduino output rises up to 5V, the diode becomes reverse-biased and no current flows from the Arduino to the SD module. The pull-up resistor lifts the data line to the 3.3V supply rail so we get our digital-1 at the required 3.3V, instead of the Arduino's 5V, so everyone's happy. (The SD module has a 3.3V voltage regulator on board that drives the pull-up resistors.)

Electrical engineers would argue that this is a dodgy fix and we should be using a dedicated level translator chip like a 74HC4050, and they're right. The diode option does work, although as we've discovered, not reliably. We tested it with half a dozen different SD cards and found two of the six worked well, one sort of worked and three didn't work at all. Some SD cards expect to see digital signals that snap between 0V and 5V in no more than five nanoseconds, while others are more tolerant and they're the ones that work.

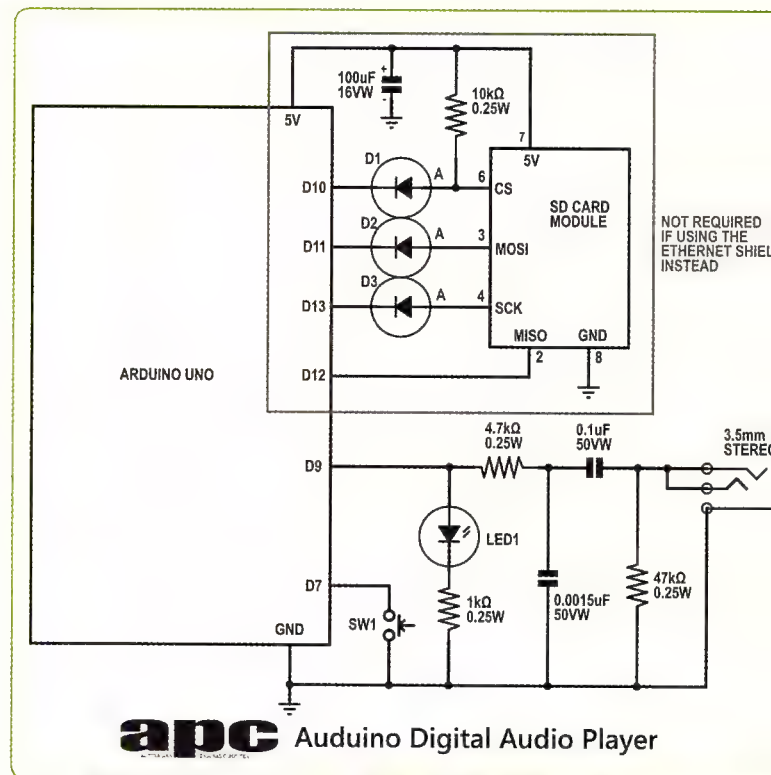
CHOOSING SD CARDS

The SD card module talks to the Arduino over the SPI (Serial Peripheral Interconnect) bus, but SPI is really just a 1-bit economy mode interface that's easy to implement, whereas SD cards normally communicate over a 4-bit wide bus. Combine our low-level translation circuitry with the fact that not all SD cards do SPI well and that unfortunately limits the cards we can use. We recommend Class 2 or Class 4 SD cards that are preferably 8GB or smaller. You can try larger Class 4 cards (we've used a 32GB card successfully), although you'll need to make some changes to our Arduino code: change the `cardType` variable from `oldCard` to `newCard`. Basically, the newer or larger the card, the slower we need to run the SPI bus, so doing this drops it back from 8MHz (half-speed) to 4MHz (quarter-speed). Any slower than 4MHz, however, and the data rate becomes too slow and you can hear the continual jitter in the sound output. We purchased new 4GB and 8GB Class 4 Verbatim cards. The 4GB card didn't work, but the 8GB card worked perfectly at the 8MHz/half-speed rate.

Our modified SD library still works with all existing Arduino programs (sketches), but adds a new instruction that allows us to adjust the Arduino's SPI speed and allow more cards to work.

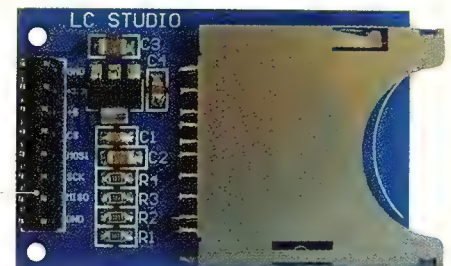
ALTERNATIVE OPTION

We've also come up with a more reliable option, which involves ditching the \$1.50 SD card reader and replacing it with a \$10 Ethernet Shield that includes a microSD card slot. You remove the components connected to pins 10, 11, 12, 13 and change the sketch by setting the `chipSelect` variable to 4 (this is marked in the sketch code). You also need to set the `cardType` variable to `oldCard`. The Ethernet Shield has the proper level translation built in to reliably work with any microSD card. The Shield sits on top of the Arduino and you use the same I/O pins for the switch and audio out.



The circuit diagram for our digital audio player.

A super-cheap SDHC card module for under \$1.50 on eBay.



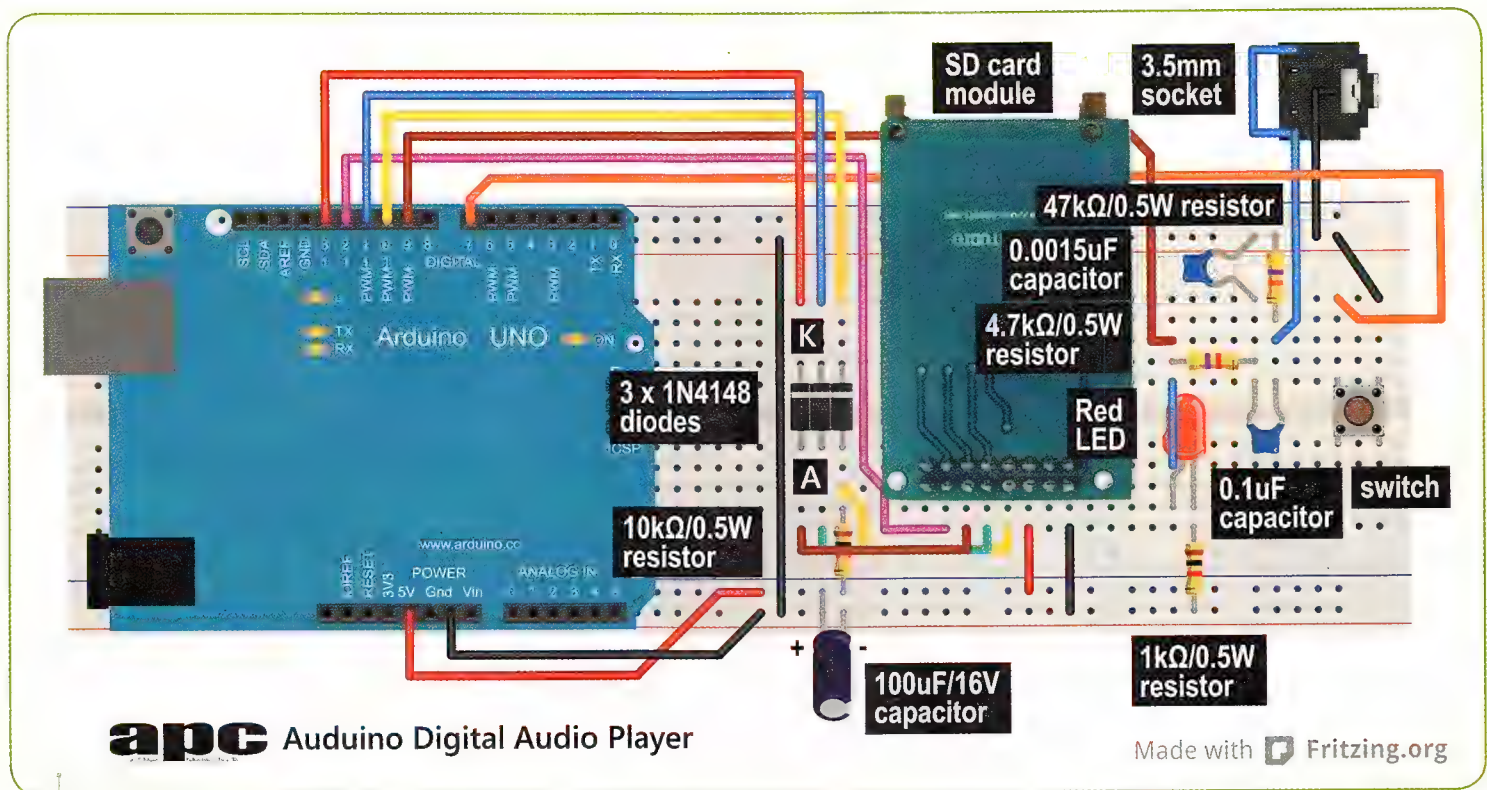
SOLDER THE STEREO SOCKET

Our Auduino player doesn't have a built-in amplifier yet, so we need external speakers and a way of getting our audio signal to them. That's what the 3.5mm stereo socket is for. We need to solder it up, so to do this, first grab a couple of Dupont wires. Cut them in half, strip the insulation off, tin them and solder them to the three tags on the socket. These give us connections to a 3.5mm plug's tip, ring and sleeve (TRS) connections. Given that we're only using mono audio, we feed the audio output to both channels so when you plug in the 3.5mm cable to your stereo amplifier, you'll hear sound coming out of both speakers.

SOFTWARE LIBRARIES

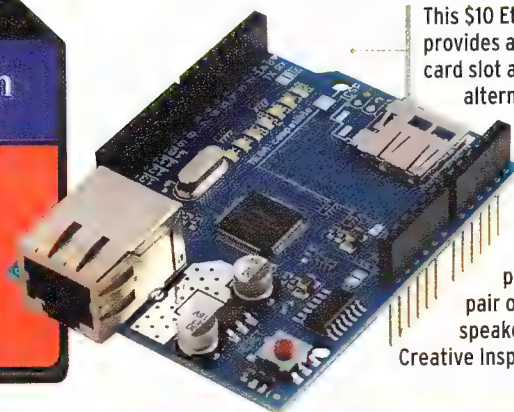
We'll need the `'tmrpcm'` and a modified `'SD'` card library. You'll find these in the zip file you can download from apcmag.com/arduino.htm. Copy the `'SD'` and `'tmrpcm'` folders to the `'libraries'` folder in your Arduino IDE folder (yes, overwrite the original `'SD'` library) and restart the IDE if you've had it running already.

The `'apc_05_audioplayer.ino'` file is our sketch, which ties everything together. It boots up the Arduino, turns on the SD module, checks the card and waits for you to press the button. Press it for less than a second and it'll load and play the first file. If you press the button again for less than a second, it'll pause playback; pressing it again resumes playback. Press it for more than a second, and it'll automatically skip forward to the next audio track and begin playback. There are no volume controls – you adjust this at your amplified speakers.



The layout diagram of our digital audio player using an 840-point breadboard.

We've used this Class 4 SDHC card from Verbatim with success.



This \$10 Ethernet Shield provides a microSDHC card slot as an alternative option.

Plug the player into a pair of computer speakers like this Creative Inspire T10 set.



Unfortunately, the 'tmrpcm' library creates a pop whenever a track stops or starts. A low-pass filter will help a little, but it's caused by the PWM signal turning on and off.

PARTS LIST

The specific parts for this project should cost you less than \$40 if you choose the SD card module option. The hardest thing to find will be the SD card module itself – we bought ours from eBay for just US\$1.48 (including shipping) from Hong Kong. The rest of the parts can be picked up from your local Jaycar Electronics or most online electronics stores.

GIVE IT A CRACK

A digital audio player we can control offers plenty of ideas. Just a few I can think of off the top of my head include a talking robot, a voice-warning security system, a talking weather station and I'm sure you can come up with a few of your own. By building this project, you'll learn more about digital audio and even be able to incorporate some of the techniques into your own Arduino projects. [BONUS](#)

ARDUINO PARTS LIST		
Part	Cost per unit	Source
Arduino Uno R3	US\$14	www.ebay.com/sch/i.html?_nkw=arduino+uno+ide
LC Studio SD card module	US\$1.48	www.ebay.com/itm/1pcs-ARM-MCU-NEW-SD-Card-Module-Slot-Socket-Reader-For-Arduino-/110950888643
Push-button momentary switch	\$1.25	www.jaycar.com.au/productView.asp?ID=SP0609
1N4148 signal diode	\$0.40	www.jaycar.com.au/productView.asp?ID=ZR1100
5mm red LED	\$0.25	www.jaycar.com.au/productView.asp?ID=ZD0150
100uF/16VW electrolytic capacitor	\$0.36	www.jaycar.com.au/productView.asp?ID=RE6310
0.1uF MKT capacitor	\$0.40	www.jaycar.com.au/productView.asp?ID=RM7125
0.0015uF MKT capacitor	\$0.35	www.jaycar.com.au/productView.asp?ID=RM7015
1k/0.25W metal-film resistor	\$0.46	www.jaycar.com.au/productView.asp?ID=RR0572
4.7k/0.25W metal-film resistor	\$0.46	www.jaycar.com.au/productView.asp?ID=RR0588
10k/0.25W metal-film resistor	\$0.46	www.jaycar.com.au/productView.asp?ID=RR0596
47k/0.25W metal-film resistor	\$0.46	www.jaycar.com.au/productView.asp?ID=RR0612
4GB Class 4 Verbatim SDHC card	\$6.75	Various retailers (including Officeworks)
3.5mm stereo socket	\$1.35	www.jaycar.com.au/productView.asp?ID=PS0132
3.5mm male-to-male cable	\$4.95	www.jaycar.com.au/productView.asp?ID=WA7008
Dupont wires	US\$3.66	www.ebay.com/itm/40PCS-Dupont-wire-jumper-cables-20cm-2-54MM-male-to-male-IP-IP-For-Arduino-/181012025872
Ethernet Shield (alternative)	US\$9.62	www.ebay.com/itm/Ethernet-Shield-W5100-For-Arduino-2009-UNO-Mega-1280-2560-/270955738702



PS4

You're so next-next-gen.

It was more a proposal than product launch as Sony unveiled the PlayStation 4... or at least unveiled the specs and developers on board. Wait, they did have the new DualShock 4 to show off. On paper the first of the next-next-gen consoles look impressive and should certainly pack a punch, but don't think it'll replace the PC as your main rig anytime soon. In the guts, Sony is boasting an x86-64 AMD Jaguar CPU, 8GB of memory and a 1.8TFLOPS, AMD Radeon GPU. At least for pushing pixels, that's almost five times more powerful than the PS3, although that roughly translates to about a mid-level PC card by today's standards. On the gaming front, the focus is on sharing with users being able to live stream gaming as well as use their Vita or smartphones as a second screen à la Wii U asynchronous gaming. There was no accurate pricing at the time of writing, but the wind is whispering ballpark figures of around \$400-\$500 – that's far more reasonable than the \$999.95 PS3 release price.

TC



Dead Space 3

A genre shift reinvigorates our deep, deep love for the Necromorph.

PC

@ www.deadspace.com

\$ \$79

By the close of *Dead Space* and about halfway through *Dead Space 2*, the formula Visceral Games followed for its survival horror franchise started to feel a little tiresome, with encounters becoming predictable and repetitive affairs. There aren't many that can boast really using more than one weapon combination the entire campaign. Stasis, Line Cutter, roll credits. And let's face it, it's just not scary or difficult. Sure, there were a few frights along the way, as well as plenty of cheap attacks from behind, but for the most part it became a comfortable sci-fi romp. Almost a vacation. And so that audible groan you hear with the release of *Dead Space 3* (DS3) isn't a Necromorph in the closet, it's me hoping for a cool, goosebumped change. And it came, just not quite how I expected.

DS3 shakes off its horror pedigree and takes a definitive leap into a softer, action gaming genre, and throws needed attention and focus to the plot and Isaac's character (he's an engineer, not a space hunter). Keep in mind that while there are a couple of new areas and environments to explore, along with a few new nasties to exterminate, you'll still be primarily treading familiar dark and dusty corridors while strategically dismembering the horrifically mutated for fun and profit. The game just feels far more direct and progress-driven, and the expanded systems and optional content sweeten the deal, leading to a more enriched single-player and co-op experience. Yes, I said co-op. Drop-in, drop-out

persistent co-op, in fact. Jump into a mate's game to stomp and loot, and your items and progress are saved across to your single-player campaign. It's seamlessly implemented and an absolute blast.

There's also a fairly comprehensive – though not entirely easy to follow – crafting system in place, and players are encouraged to scavenge and corpse-stomp the world for resources to build unique variants of the base weapons. It goes significantly deeper than upgrading a circuit or two, with players able to completely start from a bare frame and build up by crafting and blending various Tesla cores, seismic tips and auxiliary functions. It doesn't entirely eradicate the issue of the Line Cutter being the only weapon anyone ever uses, instead simply urging players to employ different Line Cutter variants. There are also upgrade options and resources available through DLC if inexhaustible wealth is a problem for you.

Porting over from the console to the PC version, it's not likely to stagger any modern machine to get it running smoothly at full fidelity.

Troy Coleman

- ✓ Significant core changes make for a more streamlined, story-focused experience, co-op, crafting.
- ✗ Crafting.

8
10



Ni no Kuni: Wrath of the White Witch

A solid contender for one of the best games of the year, if you can handle the combat.

Ni no Kuni is very Studio Ghibli. For example, take the studio's most critically successful animated film, *Spirited Away*: 10-year-old girl enters an alternate reality to save her parents from a witch. Here, the kid is 13-year-old Oliver, who travels to the parallel world of Ni no Kuni to save his mother from death, and must ultimately face off against the mysterious White Witch. Similar story, similar animation. Which is a good thing. Straight off the bat you know this is going to be a beautiful game to look at: the first look we get of Oliver's home town, Motorville, is splendidly bright and vivid, and continues in this fashion throughout.

Tutorials are a rather draining affair, though; there's just so much to learn about your spellbook, evil Shadar, 'familiar' (your sidekicks in battle) and so on. Even Drippy, your helper fairy, remarks: "Jeepers! That's so much to remember". But all of these facets add to the spectacular story and once you get past all of that, there's no looking back.

You have the option of completing an array of

@ ninokunigame.com

\$ \$88

side-quests for town folk you meet along the way, and you'll get attacked constantly by mystical animals and monsters. During combat you can choose to use Oliver or one of your familiars (they're kind of like Pokémon). A few hours in and combat feels like a bit of a chore – the action sequences are quite repetitive, and you need to continuously level up to face bigger foes. Therefore we spent a *lot* of time caught up in somewhat monotonous combat.

These slight drawbacks add up to a very lengthy RPG, which is quite alright considering the game scores on every other front. Like *Spirited Away*, its strength lies in the whimsy of the story and its rich aesthetics, which when combined with a childlike touch of magic, is an absolute joy to play.

Goldie Hong

- ✓ Captivating story, likeable characters, solid animation, soundtrack.
- ✗ Long. So very, very long.

9
10



GOD OF WAR: ASCENSION

Mash, mash, QTE, mash, mash, swoon.

@ www.godofwar.com

PS3

Oh Kratos, you're so dreamy. There's been much ado recently about the upcoming multiplayer features making a debut in the well-trodden franchise and how it may impact the single-player campaign. We were lucky enough to get some hands-on time with the single-player campaign and are beaming to report that it's just as visceral and intense as ever. Where the godly series still exceeds is in its grandiose world scale, demented otherworldly creatures and over-the-top button-mashing good times. Even though we haven't given the series a spin in a good while, the gameplay is as familiar as ever and jumping back into the role of Kratos made me remember why *God of War* is so console defining.

TC



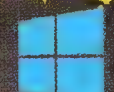
XGAMER

Buy ANY Windows 7 or 8 OS
with ANY Gaming System
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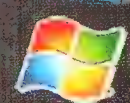
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Windows 8



Windows 7



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@ www.sennheiser.com.au
\$ \$249

Shhh Turtle Beach, the adults are talking now. Gaming headsets have come a long way, with more and more brands vying for competition in the Aussie marketplace. Sennheiser is one of the stalwarts of time. The PC 350 SE is a reboot of the now-aged 350 and brings with it a swag of features pulled from its younger brethren while keeping true to the quality of sound reproduction. Laying out the numbers, the PC 350 SE features a 150ohm impedance and 10-26K Hz frequency response; they're crystal clear and can be driven hard without any significant signal noise. Also, there's no tremendous loss of sound stage, considering the closed nature of the set. Comfort is exceptional through longer gaming sessions and the 'DJ' rotatable ear can is a nice touch if you need to keep an ear out for the family or your immediate surrounds. A foldable design and carry case are also included for safe travel to LANs.

TC



Star Wars: The Old Republic

May the Force be with you... for a price.

PC

@ www.swtor.com \$ Free (optional subscription from US\$12.99/month)

Times are tough for MMO makers. The fact that the uber-hyped *Star Wars: The Old Republic* (SWTOR) has suffered a sharp drop in subscribers and gone free-to-play just 11 months after its launch is a bit of a gut punch for the genre. So is it actually worth a second look now that it's free?

The game has two strong draws in its story and setting. They're both classic BioWare fare, with fully voice-acted dialogue and over a dozen huge planets to explore and grind through. There are specific quests that require groups, but the bulk of SWTOR can be played solo, just like BioWare's other RPGs.

As for the F2P strategy, it tries to convince you to subscribe. This is done by making things just a little frustrating for free players. For example, above level 10 free players have a 25% XP penalty applied, which means progressing takes a lot more of your time.

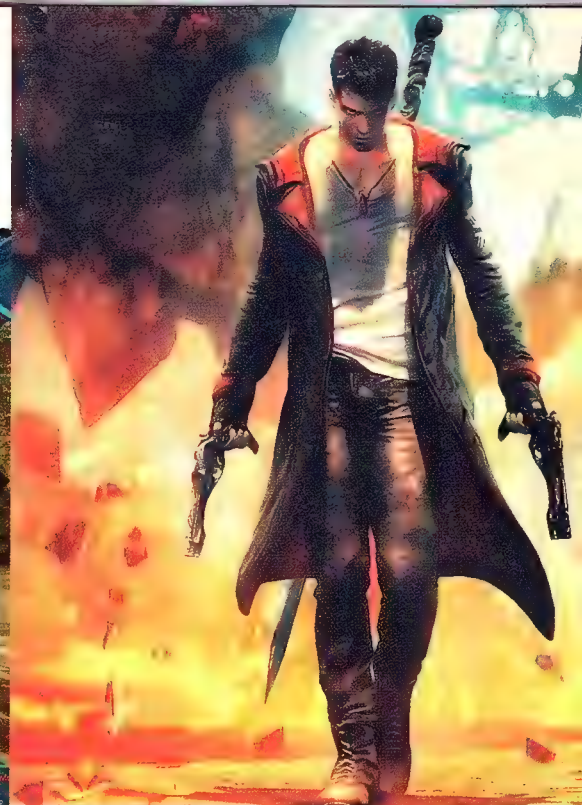
You can get rid of this by buying unlocks and consumable items from the online store and if you spend more than US\$4.99 you'll also be granted 'Preferred status' in the game, which further reduces some of the free restrictions.

While there's an undercurrent of subtle pressure to take up a subscription, it doesn't quite feel like BioWare is trying to nickel and dime you at every turn. To get the most gratifying experience, you'll need a subscription or at least spend some cash on the Cartel Market. But if you've got free time, it's possible to have an enjoyable romp without spending a cent.

Dan Gardiner

- ✓ Essentially a huge BioWare RPG for free.
- ✗ Can be arduous and time-consuming without a subscription.

8
10



DmC: Devil May Cry

We're happy with this reboot. You should be too.

PC

@ www.devilmaycry.com \$ PC \$49, consoles \$79

So, Dante doesn't have silvery white hair and people got mad. Really mad. We're confident that Dante's redesign will be forgiven by those naysayers, as this is a ripper of a hack-and-slash reimagining of the *Devil May Cry* series.

After a raunchy credit opener, Dante wakes up in a trailer, stark naked. It doesn't take long before the action kicks in and you're sucked into a glaring red state of 'limbo', meet a mysterious girl named Kat and, unbeknownst to Dante, his brother Vergil. A trip down memory lane reveals what happened to their parents at the hands of demon lord Mundus and needless to say, the brothers resolve to take him down.

While Dante's got a new look in an alternate storyline, this is still very much a classic *DmC* game: unlimited ammo, coloured orbs, style rankings, our anti-hero is crass as ever and gameplay revolves around quick, highly stylised and fun combat.

Fans will relish in unlocking melee weapons and high-calibre handguns. As you progress you get some truly awesome artillery and can upgrade Dante's weapons and abilities. What's new is you can practise using upgraded weapons/abilities before committing.

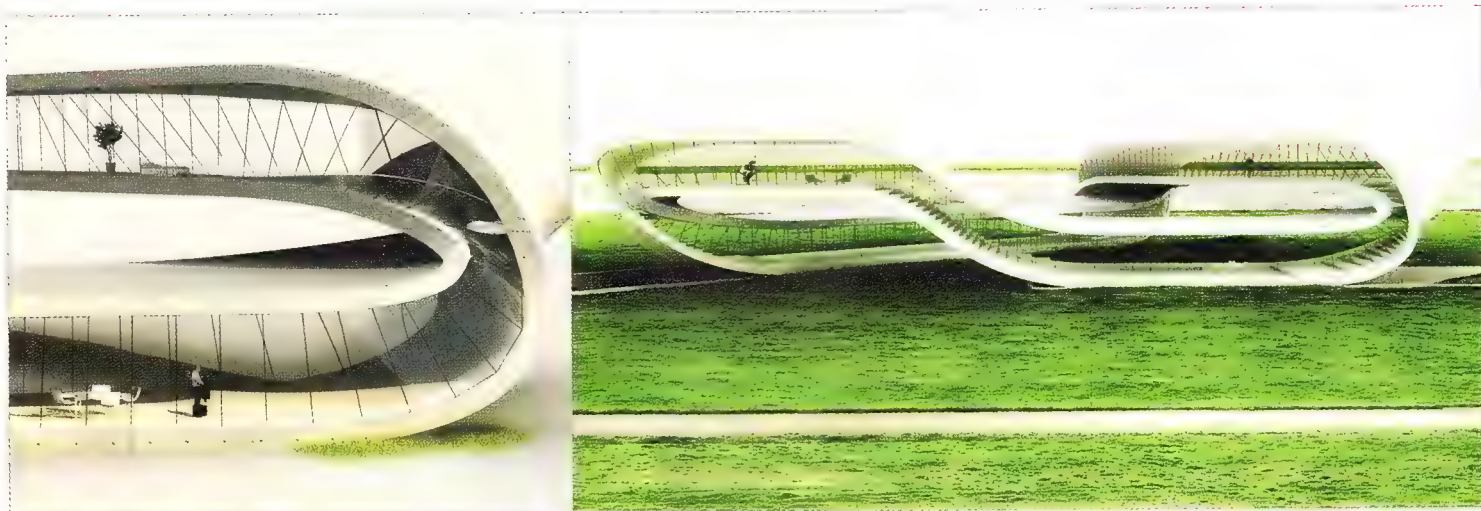
'Evade' (shift) is crucial to combat sequences. At first, the complex control scheme becomes equal parts precision timing and frustration, but once you get the hang of it, everything falls into place and feels fluid.

There are enough familiar elements to keep fans appeased, yet there's plenty of new facets to continue to entertain. What we'd really like to see next is co-op.

Goldie Hong

- ✓ Familiar gameplay, intriguing storyline, great aesthetics.
- ✗ Unlimited ammo and auto-aim is arguably unchallenging.

9
10



UNREAL ESTATE

We've spent a bit of time here playing around with 3D printing and discussing with our readers the kinds of crazy things we could potentially make if you really wanted to. Alas, the sad reality is that not many of us will ever actually follow through on our desires and 3D print our dream oversize swimming pool/rocket ship/Esky case... or will we? Dutch architect Janjaap Ruijsseenaars (he of the famed magnetic 'floating bed', just FYI) and architectural firm Universe Architecture have revealed their plans for what they hope will be the world's first 3D printed building. The Escher-like 'Landscape House', which you can see designs for here, is set to be built in Ireland next year and will be constructed from massive 6m x 9m 3D printed segments strengthened by concrete filling.

THE WRITING APP THAT LITERALLY FORCES YOU TO WRITE

Our modern lives are stuffed to the gills with so much white noise that the last thing you need is overly complicated and feature-rich software adding to the confusion. This helps explain the prevalence of today's 'distraction-free' writing apps that strip away fripperies like formatting and styles with the goal of providing a pure, focused writing environment. My personal favourite is iA Writer, which offers a nice streamlined text editor. It's available for iOS and Mac.

An interesting – and somewhat concerning – new entry has just hit the App Store. Flowstate, by developers The Discontent, takes distraction-free writing to a disturbing new level. You start the app and select how long you want to write for, but if you leave the app early for any reason – say, to check your email or browse Facebook – Flowstate unilaterally deletes what you've written so you have to start again.

To quote the makers of the app: "If they exit early, or stop writing... everything is lost. By blocking all distraction, the writer can fully commit." So if you fancy the idea of a fearfully distraction-free writing environment, or you just like a little masochism with your word processing, this self-professed "most brutal writing app" could just be for you.

** Disclaimer: I didn't write this on Flowstate. Knowing me, if I'd tried, you probably wouldn't be reading it right now...*



SEEING THINGS

So maybe Sergey Brin co-founded Google and is some kind of genius squillionaire now, but that doesn't necessarily mean he simply gets chauffeured around all the time in Google's fleet of AI-controlled robo cars, does it? OK, he probably does do that some of the time, but this snap uploaded to Twitter by wearable tech and augmented reality enthusiast Noah Zerkon (blog.integratedrealities.com) amply proves that the Google co-founder isn't above using the New York subway to get around. And presumably, making Noah's day that wee bit more sublime, Sergey was even wearing Google Glass – the company's futurish hands-free AR system currently in development – about which the two briefly conversed. The starstruck Noah later described the "most powerful man in the world" as a nice guy. **ABC**

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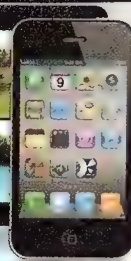
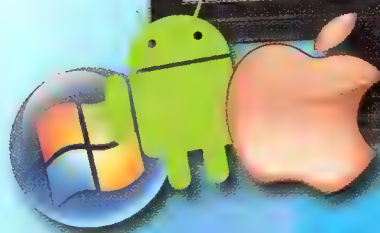
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